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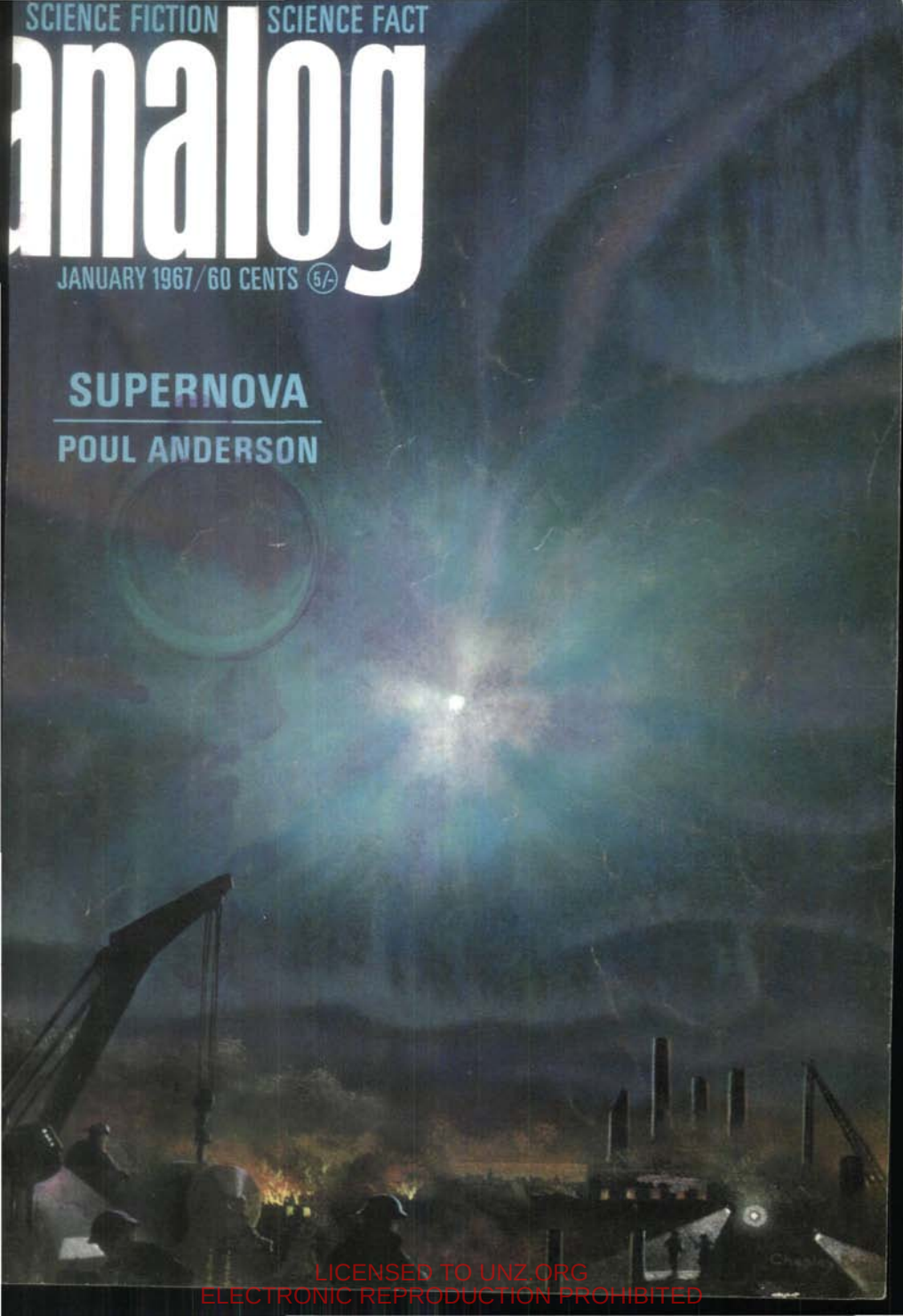

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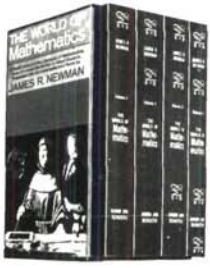

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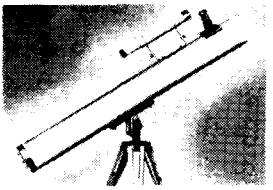

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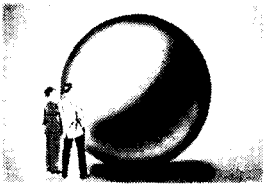

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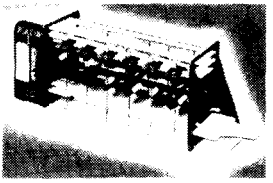

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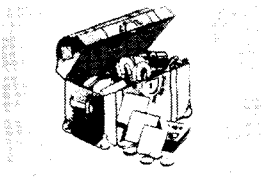

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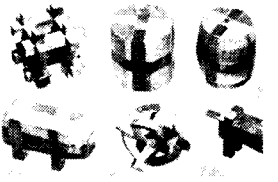

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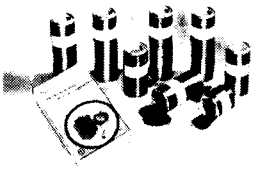

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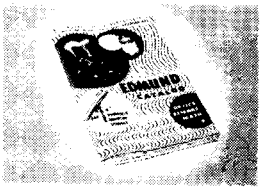

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NEXT ISSUE ON SALE
JANUARY 10, 1967
$6.00 per year
in the U.S.A.
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Cover by
Chesley Bonestell

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Secret Science

One of the troubles with Idealists is that the Idealist has certain high-minded idealistic goals in sight—and is notably unwilling to consider the logical corollaries of his Wonderful Ideal.

For example, I feel quite sure that the WCTU had no intent whatever to increase and foster crime in *this country, to aid and abet the establishment* of highly organized criminal syndicates, and to change prostitution from a system of small private businesswomen to an interstate organization, much more efficiently integrated and competently administered.

Yet those were the perfectly logical and predictable consequences of their Ideal of prohibiting the sale and manufacture of alcoholic beverages. Any strictly self-honest logician with a reasonable knowledge of human history could have predicted it. Smuggling is as old as customs duties; well-paid crime has been the basis of many a fortune, and the income from organized crime in Area A has inevitably served to establish organized crime in Area B. After all, if you're already bribing the law officers to overlook the importation of substance A, it's obvious that he might just as well overlook B while he's in the well-paid overlooking business.

And the trio "wine, women and song" have gone together since men started writing history.

Now smuggling usually has to do with a people resenting paying high taxes on something they enjoy. *When that kind of smuggling is involved,* the maximum the criminal smuggler can make is the differential between cost of production and cost-with-legal-taxes. The criminal's maximum take can't exceed the tax.

But the WCTU's Prohibition removed that normal limit; they prohibited alcoholic beverages *in toto;* the criminal's available take immediately became anything the traffic would bear.

The WCTU never did acknowledge, of course, that their Prohibition was directly and logically responsible for the inevitable corollaries. Idealists seldom recognize that the side effects of their Wonderful Ideals are what they are The honest, sincere, deeply convinced individual, seeking to achieve something he considers a great good, can somehow manage to completely deny from his awareness that the

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side effects are side effects of *his* ideas. They *must* be due to a change in the climate, all those atomic bomb tests, the rise of Communism in the world, the large number of sunspots—*anything* but his pure and wonderful Good Idea.

Or he can convince himself that "while there are some unfortunate possibilities that vicious criminals are taking advantage of, these will soon pass," or that "these minor unhappy consequences are of little importance compared to the Great Ideal Toward Which We Move."

The Great Ideal of popular Democracy has a horde of side effect corollaries, many of which aren't quite so obvious as the Prohibition-Prostitution-Bootlegger tie-in sale. Since most of Analog's readers are primarily technically interested, let's take a good look at some of the things that the Democratic Ideal is doing to Science.

Now fundamentally, Science is anti-democratic; it observes the fact that people are *not* born equal. It rewards individual scientists most unequally; some spend a lifetime trying and get nowhere—others who were undemocratically born with greater talents of intelligence, ability to persevere, or physical strength and health to drive ahead on dangerous and difficult research are rewarded with bounteous discoveries and achievements. Very undemocratic in nature.

The Great Ideal of Democracy is that if God made a mistake and created individuals with different levels of ability, then Man should correct His errors, and see to it that all men get equal reward.

The antitrust laws were established some two generations ago in the United States; as originally intended and set up, they served a most excellent purpose—they produced in this country a system of competitive capitalism, entirely different from the cartel capitalism ("monopoly capitalism" that the Russian Communists were familiar with, and constantly attacking).

But as applied under Democratic Ideals, the results to Science and Technology have been remarkable!

Since a patent is a private monopoly granted to an individual for a period of seventeen years, and monopoly is undemocratic, the growth of the Democratic Ideal of make-everybody-equal is neces-

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sarily opposed, fundamentally and in principle, to patent laws.

It's opposed to the idea of individual success through personal effort and/or unusual ability, most particularly when such success is rewarded in a realistic manner with unusual reward and privilege. Earned reward and earned privilege are undemocratic, because they make some individuals "more equal than others."

The consequence has been a steady gnawing at the foundations of the patent-law concepts. Court decisions have steadily "liberalized" patents until they are more or less useless—they don't protect the patent holder, unless that patent holder can afford to use them as a means of bankrupting the infringer through legal expenses in court suits.

After all, if the legal expenses of a prolonged patent suit amount to a million or two, the ordinary patent holder isn't able to do much about infringements.

Moreover, when the suit is finally settled, it usually winds up with finding the patent invalid.

Then the government itself has an interesting attitude on patents. The company that did the research that led to the development of tetracycline, one of the more generally effective antibiotics, got a patent on the product.

Italy does not recognize patents on chemical processes—they don't have a patent law covering chemicals. Therefore any Italian company is free to infringe any chemical patent in the world perfectly legally. So a chemical company in Italy started manufacturing tetracycline in perfectly open infringement of the American patent—which might be O.K., except that one of the Italian company's biggest customers is the U.S. government and various U.S. cities and states. The U.S. government doesn't honor the U.S. patent on the material sufficiently to reject the product of the infringement.

Even more interesting, one U.S. manufacturer was enjoined under antitrust laws from defending his patents against infringement by a Japanese company at the State Department's instigation on the basis of "friendly relations."

It has become more and more clear that the United States government does not now hold with the philosophy that underlay the ideas of the Founding Fathers with respect to the old concept that "a man is worthy of his hire." It is, of course, an undemocratic doctrine, holding that some men, who work and accomplish more, are worth more—deserve more—than others who toil not, neither do they spin.

Now when patent laws were invented, some centuries ago in England, the basis of the idea was that some individuals had discovered highly useful techniques which they kept secret, to the acute disadvantage of competitors. Not infre-

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quently the possessor of such a secret would suddenly turn up slightly dead, and his secret with him. Or the secret was passed down from father to son, maintaining a tight economic monopoly on the thing, because the family had a nice thing going, and saw no reason for increasing the amount of work they needed to do. Why should a man who was making a nice income from his secret bother to quadruple his production, just because more was wanted, when he was nicely fixed as things were?

The idea behind the patent laws was to offer the inventor a government-protected monopoly of his secret, on the condition that he agreed to publish ("make patent") exactly what the secret was, and limit the monopoly to a fixed term of years. A *quid pro quo* arrangement: in return for making public what his secret was, he got a government guarantee that, even if competitors did manage to steal his secret, the government would force them to stop using it, or pay him damages. (Royalties.)

Since the U.S. government now fails or refuses to offer that guarantee of protection . . . guess what! We're rapidly going back to secret science.

There was a period, along about the time of WWII, when secret technology was not very secret—all Company (or nation) A needed to crack the secret of Company (or nation) B was a workable sample of the product. The development of chemical and physical analysis had proceeded to such a high degree that, given a reasonable sample, simple analysis made duplication possible within a short while.

That period is effectively over; a new period of industrial secrecy has arisen, and we're well into it. Processes are *not* being patented, save in broad terms of the type that ordinary analysis reveals anyway.

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continued on page 172

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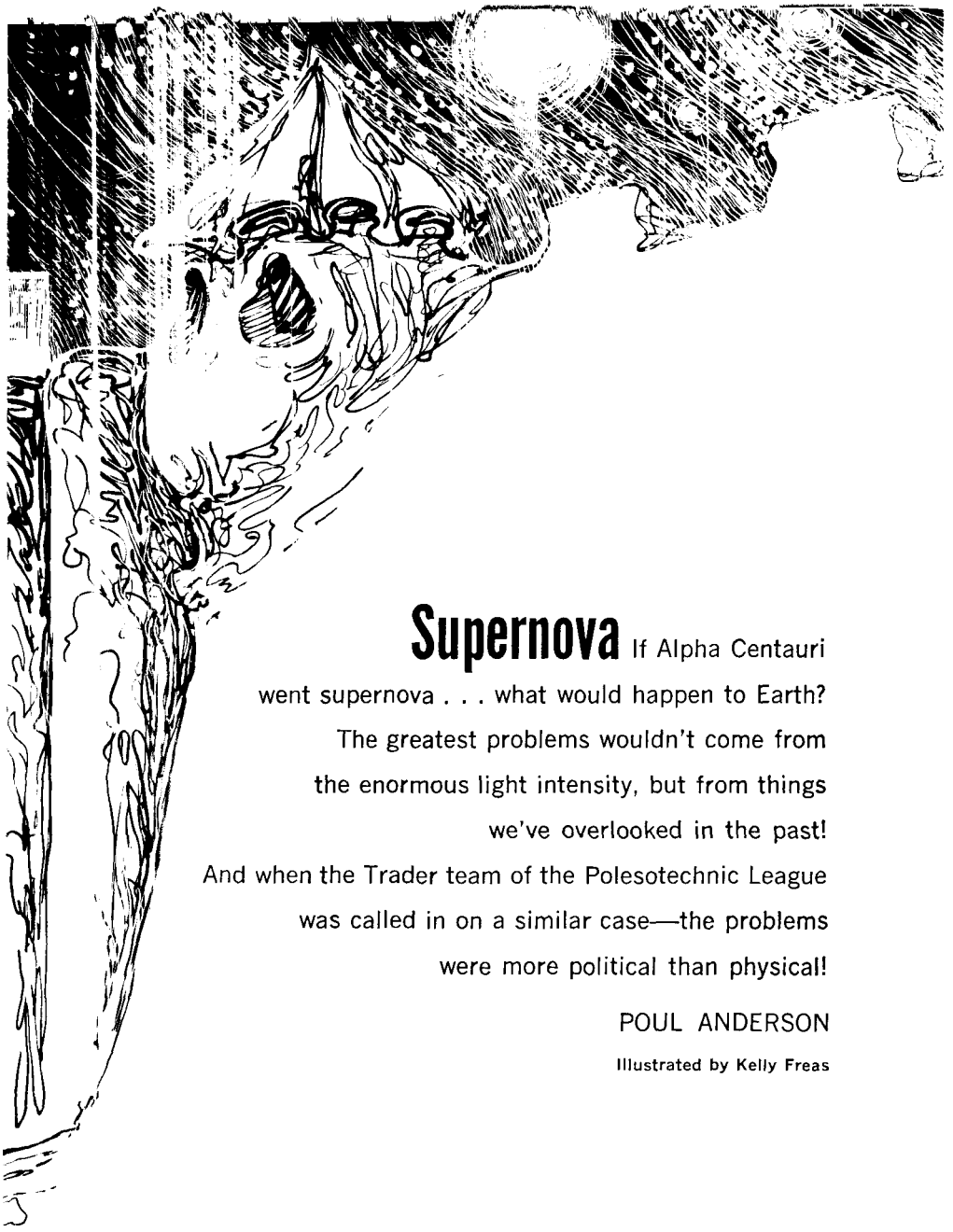

Supernova

If Alpha Centauri went supernova . . . what would happen to Earth? The greatest problems wouldn't come from the enormous light intensity, but from things we've overlooked in the past! And when the Trader team of the Polesotechnic League was called in on a similar case—the problems were more political than physical!

POUL ANDERSON

Illustrated by Kelly Freas

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For who knows how long, the star had orbited quietly in the wilderness between Betelgeuse and Rigel. It was rather more massive than average—about half again as much as Sol—and shone with corresponding intensity, white-hot, corona and prominences a terrible glory. But there are no few like it. A ship of the first Grand Survey noted its existence. However, the crew were more interested in a neighbor sun which had planets, and could not linger long in that system either. The galaxy is too big; their purpose was to get some hint about this spiral arm which we inhabit. Thus certain spectroscopic omens escaped their notice.

No one returned thither for a pair of centuries. Technic civilization had more than it could handle, let alone comprehend, in the millions of stars closer to home. So the fact remained unsuspected that this one was older than normal for its type in its region, must indeed have wandered in from other parts. Not that it was very ancient, astronomically speaking. But the great childless suns evolve fast and strangely.

By chance, though, a scout from the Polesotechnic League, exploring far in search of new markets, was passing within a light-year when the star exploded.

Say instead—insofar as simultaneity has any meaning across interstellar distances—that the death agony had occurred some months before. Even more fierce, thermonuclear reaction had burned up the last hydrogen at the center. Unbalanced by radiation pressure, the outer layers collapsed beneath their own weight. Forces were released which triggered a wholly different order of atomic fusions. New elements came into being, not only those which may be found in the planets but also the short-lived transuranics; for a while, technetium itself dominated that anarchy. Neutrons and neutrinos flooded forth, carrying with them the last balancing energy. Compression turned into catastrophe. At the brief peak, the supernova was as radiant as its entire galaxy.

So close, the ship's personnel would have died had she not been in hyperdrive. They did not remain there. A dangerous amount of radiation was still touching them between quantum microjumps. And they were not equipped to study the phenomenon. It is rare; this was the first chance in our history to observe a new supernova. Earth was too remote to help. But the scientific colony on Catawrayannis could be reached fairly soon. It could dispatch laboratory craft.

Now to track in detail what was going to happen, considerable resources were demanded. Among these were a place where men could live and instruments be made to order as the need for them arose. Such things could not well be sent from the usual factories. By the time they arrived, the wave front carrying in-

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formation about rapidly progressing events would have traveled so far that inverse-square enfeeblement would create maddening inaccuracies.

But a little beyond one parsec from the star—an excellent distance for observation over a period of years—was a G-type sun. One of its planets was terrestroid to numerous points of classification, both physically and biochemically. Survey records showed that the most advanced culture on it was at the verge of an industrial-scientific revolution. Ideal!

Except, to be sure, that Survey's information was less than sketchy, and two centuries out of date.

"No."

Master Merchant David Falkayn stepped backward in startlement. The four nearest guards clutched at their pistols. Peripherally and profanely, Falkayn wondered what canon he had violated now.

"Beg, uh, beg pardon?" he said.

Morruchan Long-Ax, the Hand of the Vach Dathyr, leaned forward on his dais. He was big even for a Merseian, which meant that he overtopped Falkayn's rangy height by a good fifteen centimeters. Long, shoulder-flared orange robes and horned miter made his bulk almost overwhelming. Beneath them, he was approximately anthropoid, save for a slanting posture counterbalanced by the tail which, with his booted feet, made a tripod for him to sit on. The skin was green, faintly scaled, totally hairless. A spiky ridge ran from the top of his skull to the end of that tail. Instead of earflaps, he had deep convolutions in his head. But the face was manlike, in a heavy-boned fashion, and the physiology was essentially mammalian.

How familiar the mind was, behind those jet eyes, Falkayn did not know.

The harsh basso said: "You shall not take the rule of this world. If we surrendered the right and freehold they won, the God would cast back the souls of our ancestors to shriek at us."

Falkayn's glance flickered around. He had seldom felt so alone. The audience chamber of Castle Afon stretched high and gaunt, proportioned like nothing men had ever built. Curiously woven tapestries on the stone walls, between windows arched at both top and bottom, and battle banners hung from the rafters, did little to stop echoes. The troopers lining the hall, down to a hearth whose fire could have roasted an elephant, wore armor and helmets with demon masks. The guns which they added to curved swords and barbed pikes did not seem out of place. Rather, what appeared unattainably far was a glimpse of ice-blue sky outside.

The air was chill with winter. Gravity was little higher than Terrestrial, but Falkayn felt it dragging at him.

He straightened. He had his own

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sidearm, no chemical slug-thrower but an energy weapon. Adzel, abroad in the city, and Chee Lan aboard the ship, were listening in via the transceiver on his wrist. And the ship had power to level all Ardaig. Morruchan must realize as much.

But he had to be made to cooperate.

Falkayn picked his words with care: "I pray forgiveness, Hand, if perchance in mine ignorance I misuse thy . . . uh . . . your tongue. Naught was intended save friendliness. Hither bring I news of peril impending, for the which ye must busk yourselves betimes less ye lose everything ye possess. My folk would fain show your folk what to do. So vast is the striving needed, and so scant the time, that perforce ye must take our counsel. Else can we be of no avail. But never will we act as conquerors. 'Twere not simply an evil deed, but 'twould boot us naught, whose trafficking is with many worlds. Nay, we would be brothers, come to help in a day of sore need."

Morruchan scowled and rubbed his chin. "Say on, then," he replied. "Frankly, I am dubious. You claim Valenderay is about to become a supernova—"

"Nay, Hand, I declare it hath already done so. The light therefrom will smite this planet in less than three years."

The time unit Falkayn actually used was Merseian, a trifle greater than Earth's. He sweated and swore to himself at the language problem. The Survey xenologists had got a fair grasp of Eriau in the several months they spent here, and Falkayn and his shipmates had acquired it by synapse transform while en route. But now it turned out that, two hundred years back, Eriau had been in a state of linguistic overturn. He wasn't even pronouncing the vowels right.

He tried to update his grammar. "Would ye, uh, I mean if your desire is . . . if you want confirmation, we can take you or a trusty member of your household so near in our vessel that the starburst is beheld with living eyes."

"No doubt the scientists and poets will duel for a berth on that trip," Morruchan said in a dry voice. "But I believe you already. You yourself, your ship and companions, are proof." His tone sharpened. "At the same time, I am no Believer, imagining you half divine because you come from outside. Your civilization has a technological head start on mine, nothing else. A careful reading of the records from that other brief period when aliens dwelt among us shows they had no reason more noble than professional curiosity. And that was fitful; they left, and none ever returned. Until now.

"So: what do you want from us?"

Falkayn relaxed a bit. Morruchan seemed to be his own kind despite everything, not awestruck,

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not idealistic, not driven by some incomprehensible nonhuman motivation, but a shrewd and skeptical politician of a pragmatically oriented culture.

Seems to be, the man cautioned himself. *What do I really know about Merseia?*

Judging by observations made in orbit, radio monitoring, initial radio contact, and the ride here in an electric groundcar, this planet still held a jumble of societies, dominated by the one which surrounded the Wilwidh Ocean. Two centuries ago, local rule had been divided among aristocratic clans. He supposed that a degree of continental unification had since been achieved, for his request for an interview with the highest authority had got him to Ardaig and a confrontation with this individual. But could Morruchan speak for his entire species? Falkayn doubted it.

Nevertheless, you had to start somewhere.

"I shall be honest, Hand," he said. "My crew and I are come as naught but preparers of the way. Can we succeed, we will be rewarded with a share in whatever gain ensueth. For our scientists wish to use Merseia and its moons as bases wherefrom to observe the supernova through the next dozen years. Best for them would be if your folk could provide them with most of their needs, not alone food but such instruments as they tell you how to fashion. For this they will pay fairly; and in addition, ye will acquire knowledge.

"Yet first must we assure that there remaineth a Merseian civilization. To do that, we must wreak huge works. And ye will pay us for our toil and goods supplied to that end. The price will not be usurious, but it will allow us a profit. Out of it, we will buy whatever Merseian wares can be sold at home for further profit." He smiled. "Thus all may win and none need fear. The Polesotechnic League compriseth nor conquerors nor bandits, naught save merchant adventurers who seek to make their"—more or less—"honest living."

"Hunh!" Morruchan growled. "Now we bite down to the bone. When you first communicated and spoke about a supernova, my colleagues and I consulted the astronomers. We are not altogether savages here; we have at least gone as far as atomic power and interplanetary travel. Well, our astronomers said that such a star reaches a peak output about fifteen billion times as great as Korych. Is this right?"

"Close enough, Hand, if Korych be your own sun."

"The only nearby one which might burst in this manner is Valenderay. From your description, the brightest in the southern sky, you must be thinking of it, too."

Falkayn nodded, realized he wasn't sure if this gesture meant the same thing on Merseia, remem-

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bered it did, and said: "Aye, Hand."

"It sounded terrifying," Morruchan said, "until they pointed out that Valenderay is three and a half light-years distant. And this is a reach so enormous that no mind can swallow it. The radiation, when it gets to us, will equal a mere one-third of what comes daily from Korych. And in some fifty-five days" (Terrestrial) "it will have dwindled to half . . . and so on, until before long we see little except a bright nebula at night.

"True, we can expect troublesome weather, storms, torrential rains, perhaps some flooding if sufficient of the south polar ice cap melts. But that will pass. In any case, the center of civilization is here, in the northern hemisphere. It is also true that, at peak, there will be a dangerous amount of ultraviolet and X radiation. But Merseia's atmosphere will block it.

"Thus." Morruchan leaned back on his tail and bridged the fingers of his oddly humanlike hands. "The peril you speak of scarcely exists. What do you really want?"

Falkayn's boyhood training, as a nobleman's son on Hermes, rallied within him. He squared his shoulders. He was not unimpressive, a tall, fair-haired young man with blue eyes bright in a lean, high-cheekboned face. "Hand," he said gravely, "I perceive you have not yet had time to consult your folk who are wise in matters—"

And then he broke down. He didn't know the word for "electronic."

Morruchan refrained from taking advantage. Instead, the Merseian became quite helpful. Falkayn's rejoinder was halting, often interrupted while he and the other worked out what a phrase must be. But, in essence and in current language, what he said was:

"The Hand is correct as far as he goes. But consider what will follow. The eruption of a supernova is violent beyond imagining. Nuclear processes are involved, so complex that we ourselves don't yet understand them in detail. That's why we want to study them. But this much we do know, and your physicists will confirm it.

"As nuclei and electrons recombine in that supernal fireball, they generate asymmetrical magnetic pulses. Surely you know what this does when it happens in the detonation of an atomic weapon. Now think of it on a stellar scale. When those forces hit, they will blast straight through Merseia's own magnetic field, down to the very surface. Unshielded electric motors, generators, transmission lines . . . oh, yes, no doubt you have surge arrestors, but your circuit breakers will be tripped, then intolerable voltages will be induced, and the entire system will be wrecked. Likewise telecommunications lines. And computers. If you use transistors . . . ah, you do . . . the flipflop between

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p and n type conduction will wipe every memory bank, stop every operation in its tracks.

"Electrons, riding that magnetic pulse, will not be long in arriving. As they spiral in the planet's field, their synchrotron radiation will completely blanket whatever electronic apparatus you may have salvaged. Protons should be slower, pushed to about half the speed of light. Then come the alpha particles, then the heavier matter: year after year after year of cosmic fallout, most of it radioactive, to a total greater by orders of magnitude than any war could create before civilization was destroyed. Your planetary magnetism is no real shield. The majority of ions are energetic enough to get through. Nor is your atmosphere any good defense. Heavy nuclei, sleeting through it, will produce secondary radiation that does reach the ground.

"I do not say this planet will be wiped clean of life. But I do say that, without ample advance preparation, it will suffer ecological disaster. Your species might or might not survive; but if you do, it will be as a few starveling primitives. The early breakdown of the electric systems on which your civilization is now dependent will have seen to that. Just imagine. Suddenly no more food moves into the cities. The dwellers go forth as a ravening horde. But if most of your farmers are as specialized as I suppose, they won't even be able to support themselves. Once fighting and famine have become general, no more medical service will be possible, and the pestilences will start. It will be like the aftermath of an all-out nuclear strike against a country with no civil defense. I gather you've avoided that on Merseia. But you certainly have theoretical studies of the subject, and—I have seen planets where it did happen.

"Long before the end, your colonies throughout this system will have been destroyed by the destruction of the apparatus that keeps the colonists alive. And for many years, no spaceship will be able to move.

"Unless you accept our help. We know how to generate force screens, small ones for machines, gigantic ones which can give an entire planet some protection. Not enough—but we also know how to insulate against the energies that get through. We know how to build engines and communications lines which are not affected. We know how to sow substances which protect life against hard radiation. We know how to restore mutated genes. In short, we have the knowledge you need for survival.

"The effort will be enormous. Most of it you must carry out yourselves. Our available personnel are too few, our lines of interstellar transportation too long. But we can supply engineers and organizers.

"To be blunt, Hand, you are very lucky that we learned of this in

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time, barely in time. Don't fear us. We have no ambitions toward Merseia. If nothing else, it lies far beyond our normal sphere of operation, and we have millions of more profitable planets much closer to home. We want to save you, because you are sentient beings. But it'll be expensive, and a lot of the work will have to be done by outfits like mine, which exist to make a profit. So, besides a scientific base, we want a reasonable economic return.

"Eventually, though, we'll depart. What you do then is your own affair. But you'll still have your civilization. You'll also have a great deal of new equipment and new knowledge. I think you're getting a bargain."

Falkayn stopped. For a while, silence dwelt in that long dim hall. He grew aware of odors which had never been on Earth or Hermes.

Morruchan said at last, slowly: "This must be thought on. I shall have to confer with my colleagues, and others. There are so many complications. For example, I see no good reason to do anything for the colony on Ronruad, and many excellent reasons for letting it die."

"What?" Falkayn's teeth clicked together. "Meaneth the Hand the next outward planet? But meseems faring goeth on apace throughout this system."

"Indeed, indeed," Morruchan said impatiently. "We depend on the other planets for a number of raw materials, like fissionables, or complex gases from the outer worlds. Ronruad, though, is of use only to the Gethfennu."

He spoke that word with such distaste that Falkayn postponed asking for a definition. "What recommendations I make in my report will draw heavily upon the Hand's wisdom," the human said.

"Your courtesy is appreciated," Morruchan replied: with how much irony, Falkayn wasn't sure. He was taking the news more coolly than expected. But then, he was of a different race from men, and a soldierly tradition as well. "I hope that, for now, you will honor the Vach Dathyr by guesting us."

"Well—" Falkayn hesitated. He had planned on returning to his ship. But he might do better on the spot. The Survey crew had found Merseian food nourishing to men, in fact tasty. One report had waxed ecstatic about the ale.

"I thank the Hand."

"Good. I suggest you go to the chambers already prepared, to rest and refresh yourself. With your leave, a messenger will come presently to ask what he should bring you from your vessel. Unless you wish to move it here?"

"Uh, best not . . . policy—" Falkayn didn't care to take chances. The Merseians were not so far behind the League that they couldn't spring a nasty surprise if they wanted to.

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Morruchan raised the skin above his brow ridges but made no comment. "You will dine with me and my councillors at sunset," he said. They parted ceremoniously.

A pair of guards conducted Falkayn out, through a series of corridors and up a sweeping staircase whose bannister was carved into the form of a snake. At the end, he was ushered into a suite. The rooms were spacious, their comfort-making gadgetry not greatly below Technic standards. Reptile-skin carpets and animal skulls mounted on the crimson-draped walls were a little disquieting, but what the hell. A balcony gave on a view of the palace gardens, whose austere good taste was reminiscent of Original Japanese, and on the city.

Ardaig was sizable, must hold two or three million souls. This quarter was ancient, with buildings of gray stone fantastically turreted and battlemented. The hills which ringed it were checkered by the estates of the wealthy. Snow lay white and b'ue-shadowed between. Ramparted with tall modern structures, the bay shone like gunmetal. Cargo ships moved in and out, a delta-wing jet whistled overhead. But he heard little traffic noise; nonessential vehicles were banned in the sacred Old Quarter.

"Wedhi is my name, Protector," said the short Merseian in the black tunic who had been awaiting him. "May he consider me his liege man, to do as he commands."

"My thanks," Falkayn said. "Thou mayest show me how one maketh use of facilities." He couldn't wait to see a bathroom designed for these people. "And then, mayhap, a tankard of beer, a textbook on political geography, and privacy for some hours."

"The Protector has spoken. If he will follow me?"

The two of them entered the adjoining chamber, which was furnished for sleeping. As if by accident, Wedhi's tail brushed the door. It wasn't automatic, merely hinged, and closed under the impact. Wedhi seized Falkayn's hand and pressed something into the palm. Simultaneously, he caught his lips between his teeth. A signal for silence?

With a tingle along his spine, Falkayn nodded and stuffed the bit of paper into a pocket.

When he was alone, he opened the note, hunched over in case of spy eyes. The alphabet hadn't changed.

Be wary, star dweller. Morruchan Long-Ax is no friend. If you can arrange for one of your company to come tonight in secret to the house at the corner of Triau Street and Victory Way which is marked by twined fylfots over the door, the truth shall be explained.

As darkness fell, the moon Neihevin rose full, Luna size and copper color, above eastward hills whose forests glistened with frost. Lythyr was already up, a small pale

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crescent. Rigel blazed in the heart of that constellation named the Spear Bearer.

Chee Lan turned from the viewscreen with a shiver and an unladylike phrase. "But I am not equipped to do that," said the ship's computer.

"The suggestion was addressed to my gods," Chee answered.

She sat for a while, brooding on her wrongs. Ta-chih-chien-pih—O_2 Eridani A II or Cynthia to humans—felt even more distant than it was, warm ruddy sunlight and rustling leaves around treetop homes lost in time as well as space. Not only the cold outside daunted her. Those Merseians were so bloody *big!*

She herself was no larger than a medium-sized dog, though the bush of her tail added a good deal. Her arms, almost as long as her legs, ended in delicate six-fingered hands. White fur fluffed about her, save where it made a bluish mask across the green eyes and round, blunt-muzzled face. Seeing her for the first time, human females were apt to call her darling.

She bristled. Ears, whiskers, and hair stood erect. What was she—descendant of carnivores who chased their prey in five-meter leaps from branch to branch, xenobiologist by training, trade pioneer by choice, and pistol champion because she liked to shoot guns—what was she doing, feeling so much as respect for a gaggle of slewfooted bald barbarians? Mainly she was irritated. While standing by aboard the ship, she'd hoped to complete her latest piece of sculpture. Instead, she must hustle into that pustulant excuse for weather, and skulk through a stone garbage dump that its perpetrators called a city, and hear some yokel drone on for hours about some squabble between drunken cockroaches which he thought was politics . . . and pretend to take the whole farce seriously!

A narcotic cigarette soothed her, however ferocious the puffs in which she consumed it. "I guess the matter is important, at that," she murmured. "Fat commissions for me if the project succeeds."

"My programming is to the effect that our primary objective is humanitarian," said the computer. "Though I cannot find that concept in my data storage."

"Never mind, Muddlehead," Chee replied. Her mood had turned benign. "If you want to know, it relates to those constraints you have filed under Law and Ethics. But no concern of ours, this trip. Oh, the bleeding hearts do quack about Rescuing a Promising Civilization, as if the galaxy didn't have too chaos many civilizations already. Well, if they want to foot the bill, it's their taxes. They'll have to work with the League, because the League has most of the ships, which it won't hire out for nothing. And the League has to start with us, because trade pioneers are supposed

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to be experts in making first contacts and we happened to be the sole such crew in reach. Which is our good luck, I suppose."

She stubbed out her cigarette and busied herself with preparations. There was, for a fact, no alternative. She'd had to admit that, after a three-way radio conversation with her partners. (They didn't worry about eavesdroppers, when not a Merseian knew a word of Anglic.) Falkayn was stuck in what's-his-name's palace. Adzel was loose in the city, but he'd be the last one you'd pick for an undercover mission. Which left Chee Lan.

"Maintain contact with all three of us," she ordered the ship. "Record everything coming in tonight over my two-way. Don't stir without orders—in a galactic language—and don't respond to any native attempts at communication. Tell us at once whatever unusual you observe. If you haven't heard from any of us for twenty-four hours at a stretch, return to Catawrayannis and report."

No answer being indicated, the computer made none.

Chee buckled on a gravity harness, a tool kit, and two guns, a stunner and a blaster. Over them she threw a black mantle, less for warmth than concealment. Dousing the lights, she had the personnel lock open just long enough to let her through, jumped, and took to the air.

It bit her with chill. Flowing past, it felt liquid. An enormous silence dwelt beneath heaven; the hum of her grav was lost. Passing above the troopers who surrounded *Muddlin' Through* with armor and artillery—a sensible precaution from the native standpoint, she had to agree, sensibly labeled an honor guard—she saw the forlorn twinkle of campfires and heard a snatch of hoarse song. Then a hovercraft whirred near, big and black athwart the Milky Way, and she must change course to avoid being seen.

For a while she flew above snow-clad wilderness. On an unknown planet, you didn't land downtown if you could help it. Hills and woods gave way at length to a cultivated plain where the lights of villages huddled around tower-jagged castles. Merseia—this continent, at least—appeared to have retained feudalism even as it swung into an industrial age. Or had it?

Perhaps tonight she would find out.

The seacoast hove in view, and Ardaig. That city did not gleam with illumination and brawl with traffic as most Technic communities did. Yellow windows strewed its night, like fireflies trapped in a web of phosphorescent paving. The River Oiss gleamed dull where it poured through town and into the bay, on which there shone a double moonglade. No, triple; Wythna was rising now. A murmur of machines lifted skyward.

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Chee dodged another aircraft and streaked down for the darkling Old Quarter. She landed behind a shuttered bazaar and sought the nearest alley. Crouched there, she peered forth. In this section, the streets were decked with a hardy turf which ice had blanketed, and lit by widely spaced lamps. A Merseian went past, riding a horned gwydh. His tail was draped back across the animal's rump; his cloak fluttered behind him to reveal a quilted jacket reinforced with glittering metal disks, and a rifle slanted over his shoulder.

No guardsman, surely; Chee had seen what the military wore, and Falkayn had transmitted pictures of Morruchan's household troops to her via a hand scanner. He had also passed on the information that those latter doubled as police. So why was a civilian going armed? It bespoke a degree of lawlessness that fitted ill with a technological society . . . unless that society was in more trouble than Morruchan had admitted. Chee made certain her own guns were loose in the holsters.

The *clop-clop* of hooves faded away. Chee stuck her head out of the alley and took bearings from street signs. Instead of words, they used colorful heraldic emblems. But the Survey people had compiled a good map of Ardaig, which Falkayn's gang had memorized. The Old Quarter ought not to have changed much. She loped off, seeking cover whenever she heard a rider or pedestrian approach. There weren't many.

This corner! Squinting through murk, she identified the symbol carved in the lintel of a lean gray house. Quickly, she ran up the stairs and rapped on the door. Her free hand rested on the stunner.

The door creaked open. Light streamed through. A Merseian stood black against it. He carried a pistol himself. His head moved back and forth, peering into the night. "Here I am, thou idiot," Chee muttered.

He looked down. A jerk went through his body. "*Hu-ya!* You are from the star ship?"

"Nay," Chee sneered, "I am come to inspect the plumbing." She darted past him, into a wainscotted corridor. "If thou wouldst preserve this chickling secrecy of thine, might one suggest that thou close yon portal?"

The Merseian did. He stood a moment, regarding her in the glow of an incandescent bulb overhead. "I thought you would be . . . different."

"They were Terrans who first visited this world, but surely thou didst not think every race in the cosmos is formed to those ridiculous specifications. Now I've scant time to spare for whatever griping ye have here to do, so lead me to thine acher."

The Merseian obeyed. His gar-

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ments were about like ordinary street clothes, belted tunic and baggy trousers, but a certain precision in their cut—as well as blue-and-gold stripes and the double fylfot embroidered on the sleeves—indicated they were a livery. Or a uniform? Chee felt the second guess confirmed when she noted two others, similarly attired, standing armed in front of a door. They saluted her and let her through.

The room beyond was baronial. Radiant heating had been installed, but a fire also roared on the hearth. Chee paid scant attention to rich draperies and carven pillars. Her gaze went to the two who sat awaiting her.

One was scarfaced, athletic, his tailnip restlessly aflicker. His robe was blue and gold, and he carried a short ceremonial spear. At sight of her, he drew a quick breath. The Cynthian decided she'd better be polite. "I hight Chee Lan, worthies, come from the interstellar expedition in response to your kind invitation."

"*Khraich.*" The aristocrat recovered his poise and touched finger to brow. "Be welcome. I am Dagla, called Quick-to-Anger, the Hand of the Vach Hallen. And my comrade: Olgor hu Freylin, his rank Warmaster in the Republic of Lafdigu, here in Ardaig as agent for his country."

That being was middle-aged, plump, with skin more dark and features more flat than was common around the Wilwidh Ocean. His garb was foreign, too; a sort of toga with metal threads woven into the purple cloth. And he was soft-spoken, imperturbable, quite without the harshness of these lands. He crossed his arm—gesture of greeting?—and said in accented Eriau:

"Great is the honor. Since the last visitors from your high civilization were confined largely to this region, perhaps you have no knowledge of mine. May I therefore say that Lafdigu lies in the southern hemisphere, occupying a goodly part of its continent. In those days we were unindustrialized, but now, one hopes, the situation has altered."

"Nay, Warmaster, be sure our folk heard much about Lafdigu's venerable culture and regretted they had no time to learn therefrom." Chee got more tactful the bigger the lies she told. Inwardly, she groaned: *Oh, no! We haven't troubles enough, there has to be international politicking too!*

A servant appeared with a cut-crystal decanter and goblets. "I trust that your race, like the Terran, can partake of Merseian refreshment?" Dagla said.

"Indeed," Chee replied. "'Tis necessary that they who voyage together use the same stuffs. I thank the Hand."

"But we had not looked for, *hurgh,* a guest your size," Olgor said. "Perhaps a smaller glass? The wine is potent."

"This is excellent." Chee hopped onto a low table, squatted, and

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raised her goblet two-handed. "Galactic custom is that we drink to the health of friends. To yours, then, worthies." She took a long draught. The fact that alcohol does not affect the Cynthian brain was one she had often found it advantageous to keep silent about.

Dagla tossed off a yet larger amount, took a turn around the room, and growled: "Enough formalities, by your leave, Shipmaster." She discarded her cloak. "Shipmistress?" He gulped. His society had a kitchen-church-and-kids attitude toward females. "We . . . *kh-h-h* . . . we've grave matters to discuss."

"The Hand is too abrupt with our noble guest," Olgor chided.

"Nay, time is short," Chee said. "And clearly the business hath great weight, sith ye went to the length of suborning a servant in Morruchan's very stronghold."

Dagla grinned. "I planted Wedhi there eight years ago. He's a good voice-tube."

"No doubt the Hand of the Vach Hallen hath surety of all his own servitors?" Chee purred.

Dagla frowned. Olgor's lips twitched upward.

"Chances must be taken." Dagla made a chopping gesture. "All we know is what was learned from your first radio communications, which said little. Morruchan was quick to isolate you. His hope is plainly to let you hear no more of the truth than he wants. To use you! Here, in this house, we may speak frankly with each other."

As frankly as you two klongs choose, Chee thought. "I listen with care," she said.

Piece by piece, between Dagla and Olgor, the story emerged. It sounded reasonable, as far as it went.

When the Survey team arrived, the Wilwidh culture stood on the brink of a machine age. The scientific method had been invented. There was a heliocentric astronomy, a post-Newtonian pre-Maxwellian physics, a dawning chemistry, a well-developed taxonomy, some speculations about evolution. Steam engines were at work on the first railroads. But political power was fragmented among the Vachs. The scientists, the engineers, the teachers were each under the patronage of one or another Hand.

The visitors from space had too much sense of responsibility to pass on significant practical information. It wouldn't have done a great deal of good anyway. How do you make transistors, for instance, before you can refine ultra-pure semimetals? And why should you want to, when you don't yet have electronics? But the humans had given theoretical and experimental science a boost by what they related—above all, by the simple and tremendous fact of their presence.

And then they left.

A fierce, proud people had their

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noses rubbed in their own insignificance. Chee guessed that here lay the root of most of the social upheaval which followed. And belike a more urgent motive than curiosity, or profit, began to drive the scientists: the desire, the need to catch up, to bring Merseia in one leap onto the galactic scene.

The Vachs had shrewdly ridden the wave. Piecemeal they shelved their quarrels, formed a loose confederation, met the new problems well enough that no movement arose to strip them of their privileges. But rivalry persisted, and cross purposes, and often a reactionary spirit, a harking back to olden days when the young were respectful of the God and their elders.

And meanwhile modernization spread across the planet. A country which did not keep pace soon found itself under foreign domination. Lafdigu had succeeded best. Chee got a distinct impression that the Republic was actually a hobnail-booted dictatorship. Its own imperial ambitions clashed with those of the Hands. Nuclear war was averted on the ground, but space battles had erupted from time to time, horribly and inconclusively.

"So here we are," Dagla said. "Largest, most powerful, the Vach Dathyr speak loudest in this realm. But others press upon them, Hallen, Ynvory, Rueth, yes, even landless Urdiolch. You can see what it would mean if any one of them obtained your exclusive services."

Olgor nodded. "Among other things," he said, "Morruchan Long-Ax would like to contrive that my country is ignored. We are in the southern hemisphere. We will get the worst of the supernova blast. If unprotected, we will be removed from his equations."

"In whole truth, Shipmistress," Dagla added, "I don't believe Morruchan wants your help. *Khraich,* yes, a minimum, to forestall utter collapse. But he has long ranted against the modern world and its ways. He'd not be sorry to see industrial civilization reduced so small that full-plumed feudalism returns."

"How shall he prevent us from doing our work?" Chee asked. "Surely he is not fool enough to kill us. Others will follow."

"He'll bet the knucklebones as they fall," Dagla said. "At the very least, he'll try to keep his position—that you work through him and get most of your information from his sources—and use it to increase his power. At the expense of every other party!"

"We could predict it even in Lafdigu, when first we heard of your coming," Olgor said. "The Strategic College dispatched me here to make what alliances I can. Several Hands are not unwilling to see my country continue as a force in the world, as the price for our help in diminishing their closer neighbors."

Chee said slowly: "Meseems ye make no few assumptions about us, on scant knowledge."

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"Shipmistress," said Olgor, "civilized Merseia has had two centuries to study each word, each picture, each legend about your people. Some believe you akin to gods—or demons—yes, whole cults have flowered from the expectation of your return, and I do not venture to guess what they will do now that you are come. But there have also been cooler minds; and that first expedition was honest in what it told, was it not?

"Hence: the most reasonable postulate is that none of the starfaring races have mental powers we do not. They simply have longer histories. And as we came to know how many the stars are, we saw how thinly your civilization must be spread among them. You will not expend any enormous effort on us, in terms of your own economy. You cannot. You have too much else to do. Nor have you time to learn everything about Merseia and decide every detail of what you will effect. The supernova will flame in our skies in less than three years. You must cooperate with whatever authorities you find, and take their word for what the crucial things are to save and what others must be abandoned. Is this not truth?"

Chee weighed her answer. "To a certain degree," she said carefully, "ye have right."

"Morruchan knows this," Dagla said. "He'll use the knowledge as best he can." He leaned forward, towering above her. "For our part, we will not tolerate it. Better the world go down in ruin, to be rebuilt by us, than that the Vach Da hyr engulf what our ancestors wrought. No planet-wide effort can succeed without the help of a majority. Unless we get a full voice in what decisions are made, we'll fight."

"Hand, Hand," reproved Olgor.

"Nay, I take not offense," Chee said. "Rather, I give thanks for so plain a warning. Ye will understand, we bear ill will toward none on Merseia, and have no partisanship—" *in your wretched little jockeyings.* "If ye have prepared a document stating your position, gladly will we ponder on the same."

Olgor opened a casket and took out a sheaf of papers bound in something like snakeskin. "This was hastily written," he apologized. "At another date we would like to give you a fuller account."

"'Twill serve for the nonce." Chee wondered if she should stay a while. No doubt she could learn something further. But chaos, how much propaganda she'd have to strain out of what she heard! Also, she'd now been diplomatic as long as anyone could expect. Hadn't she?

They could call the ship directly, she told them. If Morruchan tried to jam the airwaves, she'd jam him, into an unlikely posture. Olgor looked shocked. Dagla objected to communication which could be monitored. Chee sighed. "Well, then, invite us hither for a private

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talk," she said. "Will Morruchan attack you for that?"

"No . . . I suppose not . . . but he'll get some idea of what we know and what we're doing."

"My belief was," said Chee in her smoothest voice, "that the Hand of the Vach Hallen wished naught save an end to these intrigues and selfishnesses, an openness in which Merseians might strive together for the common welfare."

She had never cherished any such silly notion, but Dagla couldn't very well admit that his chief concern was to get his own relatives on top of everybody else. He made wistful noises about a transmitter which could not be detected by Merseian equipment. Surely the galactics had one? They did, but Chee wasn't about to pass on stuff with that kind of potentialities. She expressed regrets—nothing had been brought along—so sorry—good night, Hand, goodnight, Warmaster.

The guard who had let her in escorted her to the front door. She wondered why her hosts didn't. Caution, or just a different set of mores? Well, no matter. Back to the ship. She ran down the frosty street, looking for an alley from which her takeoff wouldn't be noticed. Someone might get trigger happy.

An entrance gaped between two houses. She darted into darkness. A body fell upon her. Other arms clasped tight, pinioning. She yelled. A light gleamed briefly, a sack was thrust over her head, she inhaled a sweet-sick odor and whirled from her senses.

Adzel still wasn't sure what was happening to him, or how it had begun. There he'd been, minding his own business, and suddenly he was the featured speaker at a prayer meeting. If that was what it was.

He cleared his throat. "My friends," he said.

A roar went through the hall. Faces and faces and faces stared at the rostrum which he filled with his four and a half meters of length. A thousand Merseians must be present: clients, commoners, city proletariat, drably clad for the most part. Many were female; the lower classes didn't segregate sexes as rigidly as the upper. Their odors made the air thick and musky. Being in a new part of Ardaig, the hall was built plain. But its proportions, the contrasting hues of paneling, the symbols painted in scarlet across the walls, reminded Adzel he was on a foreign planet.

He took advantage of the interruption to lift the transceiver hung around his neck up to his snout and mutter plaintively, "David, what *shall* I tell them?"

"Be benevolent and noncommittal," Falkayn's voice advised. "I don't think mine host likes this one bit."

The Wodenite glanced over the seething crowd, to the entrance. Three of Morruchan's household guards stood by the door.

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He didn't worry about physical attack. Quite apart from having the ship for a backup, he was too formidable himself: a thousand-kilo centauroid, his natural armorplate shining green above and gold below, his spine more impressively ridged than any Merseian's. His ears were not soft cartilage but bony, a similar shelf protected his eyes, his rather crocodilian face opened on an alarming array of fangs. Thus he had been the logical member of the team to wander around the city today, gathering impressions. Morruchan's arguments against this had been politely overruled. "Fear no trouble, Hand," Falkayn said truthfully. "Adzel never seeketh any out. He is a Buddhist, a lover of peace who can well afford tolerance anent the behavior of others."

By the same token, though, he had not been able to refuse the importunities of the crowd which finally cornered him.

"Have you got word from Chee?" he asked.

"Nothing yet," Falkayn said. "Muddlehead's monitoring, of course. I imagine she'll contact us tomorrow. Now don't you interrupt me either. I'm in the middle of an interminable official banquet."

Adzel raised his arms for silence, but here that gesture was an encouragement for more shouts. He changed position, his hooves clattering on the platform, and his tail knocked over a floor candelabrum. "Oh, I'm sorry," he exclaimed. A red-robed Merseian named Gryf, the chief nut of this organization—Star Believers, was that what they called themselves?—picked the thing up and managed to silence the house.

"My friends," Adzel tried again. "Er . . . my friends. I am, er, deeply appreciative of the honor ye do me in asking for some few words." He tried to remember the political speeches he had heard while a student on Earth. "In the great fraternity of intelligent races throughout the universe, surely Merseia hath a majestic part to fulfill."

"Show us . . . show us the way!" howled from the floor. "The way, the truth, the long road futureward!"

"Ah . . . yes. With pleasure." Adzel turned to Gryf. "But perchance first your, er, glorious leader should explain to me the purposes of this . . . this—" What was the word for "club?" Or did he want "church"?

Mainly he wanted information.

"Why, the noble galactic jests," Gryf said in ecstasy. "You know we are those who have waited, living by the precepts the galactics taught, in loyal expectation of their return which they promised us. We are your chosen instrument for the deliverance of Merseia from its ills. Use us!"

Adzel was a planetologist by pro-

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fession, but his large bump of curiosity had led him to study in other fields. His mind shuffled through books he had read, societies he had visited . . . yes, he identified the pattern. These were cultists, who'd attached a quasi-religious significance to what had actually been quite a casual stopover. Oh, the jewel in the lotus! What kind of mess had ensued?

He had to find out.

"That's, ah, very fine," he said. "Very fine indeed. Ah . . . how many do ye number?"

"More than two million, Protector, in twenty different nations. Some high ones are among us, yes, the Heir of the Vach Isthyr. But most belong to the virtuous poor. Had they all known the Protector was to walk forth this day— Well, they'll come as fast as may be, to hear your bidding."

An influx like that could make the pot boil over, Adzel foresaw. Ardaig had been restless enough as he quested through its streets. And what little had been learned about basic Merseian instincts, by the Survey psychologists, suggested they were a combative species. Mass hysteria could take ugly forms.

"No!" the Wodenite cried. The volume nearly blew Gryf off the podium. Adzel moderated his tone. "Let them stay home. Calm, patience, carrying out one's daily round of duties, those are the galactic virtues."

Try telling that to a merchant adventurer! Adzel checked himself. "I fear we have no miracles to offer."

He was about to say that the word he carried was of blood, sweat, and tears. But no. When you dealt with a people whose reactions you couldn't predict, such news must be released with care. Falkayn's first radio communications had been guarded, on precisely that account.

"This is clear," Gryf said. He was not stupid, or even crazy, except in his beliefs. "We must ourselves release ourselves from our oppressors. Tell us how to begin."

Adzel saw Morruchan's troopers grip their rifles tight. *We're expected to start some kind of social revolution?* he thought wildly. *But we can't! It's not our business. Our business is to save your lives, and for that we must not weaken but strengthen whatever authority can work with us, and any revolution will be slow to mature, a consequence of technology— Dare I tell them this tonight?*

Pedantry might soothe them, if only by boring them to sleep. "Among those sophonts who need a government," Adzel said, "the basic requirement for a government which is to function well is that it be legitimate, and the basic problem of any political innovator is how to continue, or else establish anew, a sound basis for that legitimacy. Thus newcomers like myself cannot—"

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He was interrupted—later he was tempted to say "rescued"—by a noise outside. It grew louder, a harsh chant, the clatter of feet on pavement. Females in the audience wailed. Males snarled and moved toward the door. Gryf sprang from the platform, down to what Adzel identified as a telecom, and activated the scanner. It showed the street, and an armed mob. High over them, against snow-laden roofs and night sky, flapped a yellow banner.

"Demonists!" Gryf groaned. "I was afraid of this."

Adzel joined him. "Who be they?"

"A lunatic sect. They imagine you galactics mean, have meant from the first, to corrupt us to our destruction. I was prepared, though. See." From alleys and doorways moved close-ranked knots of husky males. They carried weapons.

A trooper snapped words into the microphone of a walkie-talkie. Sending for help, no doubt, to quell the oncoming riot. Adzel returned to the rostrum and filled the hall with his pleas that everyone remain inside.

He might have succeeded, by reverberation if not reason. But his own transceiver awoke with Falkayn's voice: "Get here at once! Chee's been nabbed!"

"What? Who did it? Why?" The racket around became of scant importance.

"I don't know. Muddlehead just alerted me. She'd left this place she was at. Muddlehead received a yell, sounds of scuffling, then no more from her. I'm sending him aloft, to try and track her by the carrier wave. He says the source is moving. You move too, back to Afon."

Adzel did. He took part of the wall with him.

Korych rose through winter mists that turned gold as they smoked past city towers and above the river. Kettledrums rolled their ritual from Eidh Hill. Shutters came down off windows and doors, market circles began to fill, noise lifted out of a hundred small workshops. Distantly, but deeper and more portentous, sounded the buzz of traffic and power from the new quarters, hoot of ships on the bay, whine of jets overhead, thunder of rockets as a craft left the spaceport for the moon Seith.

Morruchan Long-Ax switched off the lights in his confidence chamber. Dawnglow streamed pale through glass, picking out the haggardness of faces. "I am weary," he said, "and we are on a barren trail."

"Hand," said Falkayn, "it had better not be. Here we stay until we have reached some decision."

Morruchan and Dagla glared. Olgor grew expressionless. They were none of them accustomed to being addressed thus. Falkayn gave them stare for stare, and Adzel lifted his head from where he lay coiled on the floor. The Merseians slumped back onto their tails.

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"Your whole world may be at stake, worthies," Falkayn said. "My people will not wish to spend time and treasure, aye, some lives, if they look for such ungrateful treatment."

He picked up the harness and kit which lay on Morruchan's desk and hefted them. Guided by Muddlehead, searchers from this household had found the apparatus in a ditch outside town and brought it here several hours ago. Clearly Chee's kidnappers had suspected a signal was being emitted. The things felt pitifully light in his hand.

"What more can be said?" Olgor argued. "We have each voiced a suspicion that one of the others engineered the deed to gain a lever for himself. Or yet a different Vach, or another nation, may have done it; or the Demonists; or even the Star Believers, for some twisted reason." He turned to Dagla. "Are you certain you have no inkling who that servant of yours may have been working for?"

"I told you before, no," said the Hallen chief. "It's not our way in this country to pry into lives. I know only that Dwyr entered my service a few years ago, and gave satisfaction, and now has also vanished. So I presume he was a spy for someone else, and told his masters of a chance to seize a galactic. A telecom call would be easy to make, and they needed only to cover the few possible routes she could take on leaving me."

"In sum," Morruchan declared, "he acted just like your spy who betrayed my doings to you."

"Enough, worthies," Falkayn sighed. "Too stinking often this night have we tracked the same ground. Perchance investigation will give some clues to this Dwyr, whence he came and so forth. But such taketh time. We must needs look into every possibility at once. Including your very selves. Best ye perform a mutual checking."

"And who shall do the like for you?" Morruchan asked.

"What meaneth the Hand?"

"This might be a trick of your own."

Falkayn clutched his hair. "For what conceivable reason?" He wanted to say more, but relations were strained already.

"How should I know?" Morruchan retorted. "You are unknowns. You *say* you have no imperial designs here, but your agents have met with rivals of mine, with a cult whose main hope is to upset the order of things—and with how many else? The Gethfennu?"

"Would the Hand be so gracious as to explain to me who those are?" said Adzel in an oil-on-the-waves voice.

"We described them already," Dagla answered.

"Then 'twas whilst I was out, Hand, directing our ship in its search and subsequent return to base. Indulge a humble fool's request, I beg you."

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The idea of someone equipped like Adzel calling himself a humble fool took the Merseians so much aback that they forgot to stay angry. Falkayn added: "I'd not mind hearing about them again. Never suspected I their existence erenow."

"They are the criminal syndicate, spread across the world and on into space," Morruchan said. "Thieves, assassins, harlots, tricksters, corrupters of all good."

He went on, while Falkayn analyzed his words. No doubt the Gethfennu were a bad influence. But Morruchan was too prejudiced, and had too little historical sense, to see why they flourished. The industrial revolution had shaken foundation stones loose from society. Workers flocking to the cities found themselves cut off from the old feudal restrictions . . . and securities. Cultural and material impoverishment bred lawlessness. Yet the baronial tradition survived, in a distorted form; gangs were soon gathered into a network which offered members protection and purpose as well as loot.

The underground kingdom of the Gethfennu could not be destroyed by Vachs and nations divided against each other. It fought back

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too effectively, with money and influence more often than with violence. And, to be sure, it provided some safety valve. A commoner who went to one of its gambling dens or joyhouses might get fleeced, but he would not plot insurrection.

So a tacit compromise was reached, the kind that many planets have known, Earth not least among them. Racketeering and vice were held to a tolerable level, confined to certain areas and certain classes, by the gang lords. Murder, robbery, and shakedown did not touch the aristocratic palace or the high financial office. Bribery did, in some countries, and thereby the Gethfennu was strengthened.

Of late, its tentacles had stretched beyond these skies. It bought into established interplanetary enterprises. And then there was Ronruad, the next planet out. Except for scientific research, it had scant intrinsic value, but bases upon it were of so great strategic importance that they had occasioned wars. Hence the last general peace treaty had neutralized it, placed it outside any jurisdiction. Soon afterward, the Gethfennu took advantage of this by building a colony there, where anything went. A spaceship line, under the syndicate's open-secret control, offered passenger service. Luridor became the foremost town for respectable Merseians to go in search of unrestrained, if expensive fun. It also became a hatchery of trouble, and Falkayn could understand why Morruchan didn't want it protected against the supernova.

Neither, he found, did Dagla. Probably few if any Hands did. Olgor was less emphatic, but agreed that, at best, Ronruad should get a very low priority.

"The Gethfennu may, then, have seized Chee Lan for ransom?" Adzel said.

"Perhaps," Dagla said. "Though the ransom may be that you galactics help them. If they've infiltrated Hand Morruchan's service too, they could know what the situation is."

"But," Falkayn objected, "they are scarcely so naïve as to think—"

"I shall investigate," Morruchan promised. "I may make direct inquiry. But channels of communication with the Gethfennu masters are devious, therefore slow."

"In any event," Falkayn said bleakly, "Adzel and I do not propose to leave our partner in the grip of criminals—for years, after which they may cut her throat."

"You do not know they have her," Olgor reminded him.

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"True. Yet may we prowl somewhat through space, out toward their colony. For little can we do on Merseia, where our knowledge is scant. Here must ye search, worthies, and contrive that all others search with you."

The command seemed to break Morruchan's thin-stretched patience. "Do you imagine we've nothing better to do than hunt for one creature? We, who steer millions?"

Falkayn lost his temper likewise. "If ye wish to keep on doing thus, best ye make the finding of Chee Lan your foremost concern!"

"Gently, gently," Olgor said. "We are so tired that we are turning on allies. And that is not well." He laid a hand on Falkayn's shoulder. "Galactic," he said, "surely you can understand that organizing a system-wide hunt, in a world as diverse as ours, is a greater task than the hunt itself. Why, no few leaders of nations, tribes, clans, factions will not believe the truth if they are told. Proving it to them will require diplomatic skill. Then there are others whose main interest will be to see if they cannot somehow maneuver this affair to give them an advantage over us. And yet others hope you do go away and never return; I do not speak merely of the Demonists."

"If Chee be not returned safely," Falkayn said, "those last may well get their wish."

Olgor smiled. The expression went no deeper than his lips. "Galactic," he murmured, "let us not play word games. Your scientists stand to win knowledge and prestige here, your merchants a profit. They will not allow an unfortunate incident, caused by a few Merseians and affecting only one of their folk . . . they will not let that come between them and their objectives. Will they?"

Falkayn looked into the ebony eyes. His own were the first to drop. Nausea caught at his gullet. The Warmaster of Lafdigu had identified his bluff and called it.

Oh, no doubt these who confronted him would mount some kind of search. If nothing else, they'd be anxious to learn what outfit had infiltrated agents onto their staffs, and to what extent. No doubt, also, various other Merseians would cooperate. But the investigation would be ill-coordinated and lackadaisical. It would hardly succeed against beings as wily as those who captured Chee Lan.

These three here—nigh the whole of Merseia—just didn't give a damn about her.

She awoke in a cell.

It was less than three meters long, half that in width and height: windowless, doorless, comfortless. A coat of paint did not hide the basic construction, which was of large blocks. Their unresponsiveness to her fist-pounding suggested a high density. Brackets were bolted into the walls, to hold equipment of different sorts in place. Despite non-

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Technic design, Chee recognized a glowlamp, a thermostated air renewer, a waste unit, an acceleration couch . . . space gear, by Cosmos!

No sound, no vibration other than the faint whirr of the air unit's fan, reached her. The walls were altogether blank. After a while, they seemed to move closer. She chattered obscenities at them.

But she came near weeping with relief when one block slid aside. A Merseian face looked in. Behind was polished metal. Rumble, clangor, shouted commands resounded through what must be a spaceship's hull, from what must be a spaceport outside.

"Are you well?" asked the Merseian. He looked still tougher than average, but he was trying for courtesy, and he wore a neat tunic with insignia of rank.

Chee debated whether to make a jump, claw his eyes out, and bolt for freedom. No, not a chance. But neither was she going to embrace him. "Quite well, I thank thee," she snarled, "if thou'lt set aside trifles such as that thy heart-rotten varlets have beaten and gassed me, and I am athirst and anhungered. For this outrage, methinks I'll summon my mates to blow thy pesthole of a planet from the universe it defileth."

The Merseian laughed. "You can't be too sick, with that kind of spirit. Here are food and water." He passed her some containers. "We blast off soon for a voyage of a few days. Do you need anything?"

"Where are we bound? Who art thou? What meaneth—"

"*Hurh,* little one, I'm not going to leave this smugglehole open very long, for any spillmouth to notice. Tell me this instant what you want, so I can try to have it sent from the city."

Later Chee swore at herself, more picturesquely than she had ever cursed even Adzel. Had she specified the right things, they might have been a clue for her partners. But she was too foggy in the head, too dazed by events. Automatically, she asked for books and films which might help her understand the Merseian situation better. And a grammar text, she added in haste. She was tired of sounding like a local Shakespeare. The Merseian nodded and pushed the block back in place. She heard a faint click. Doubtless a tongue-and-groove lock, operated by a magnetic key.

The rations were revivifying. Before long, Chee felt in shape to make deductions. She was evidently in a secret compartment, built into the wall of a radiation shelter.

Merseian interplanetary vessels ran on a thermonuclear-powered ion drive. Those which made landings—ferries tending the big ships, or special jobs such as this presumably was—set down in deep silos and departed from them, so that electromagnetic fields could contain the blast and neutralize it before it poisoned the neighborhood. And each craft carried a blockhouse for

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crew and passengers to huddle in, should they get caught by a solar storm. Altogether, the engineering was superb. Too bad it would go by the board as soon as gravity drive and force screens became available.

A few days, at one Merseian G: hm-m-m, that meant an adjacent planet. Not recalling the present positions, Chee wasn't sure which. A lot of space traffic moved in the Korychan System, as instruments had shown while *Muddlin' Through* approached. From a distance, in magniscreens, she had observed some of the fleet, capacious cargo vessels and sleek naval units.

Her captor returned with the materials she had requested and a warning to strap in for blastoff. He introduced himself genially as Iriad the Wayfarer, in charge of this dispatch boat.

"Who art thou working for?" Chee demanded.

He hesitated, then shrugged. "The Gethfennu." The block glided back to imprison her.

Lift was nothing like the easy upward floating of a galactic ship. Acceleration rammed Chee down into her couch and sat on her chest. Thunder shuddered through the very blockhouse. Eternal minutes passed before the pressure slacked off and the boat fell into steady running.

After that, for a timeless time, Chee had nothing to do but study. The officers brought her rations. They were a mixed lot, from every part of Merseia; some did not speak Eriau, and none had much to say to her. She considered tinkering her life support apparatus into a weapon, but without tools the prospect was hopeless. So for amusement she elaborated the things she would like to do to Iriad, come the day. Her partners would have flinched.

Once her stomach, the only clock she had, told her she was far overdue for a meal. When finally her cell was opened, she leaped forward in a whirlwind of abuse. Iriad stepped back and raised a pistol. Chee stopped and said: "Well, what happened? Hadn't my swill gotten moldy enough?"

Iriad looked shaken. "We were boarded," he said low.

"How's that?" Acceleration had never varied.

"By . . . your people. They laid alongside, matching our vector as easily as one runner might pace another. I did not know what armament they had, so—He, who came aboard, was a dragon."

Chee beat her fists on the shelter deck. Oh, no, no, no! Adzel had passed within meters of her, and never suspected . . . the big, ugly, vacuum-skulled bumblemaker!

Iriad straightened. "But Haguan warned me it might happen," he said with a return of self-confidence. "We know somewhat about smuggling. And you are not gods, you galactics."

"Where did they go?"

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"Away. To inspect other vessels. Let them."

"Do you seriously hope to keep me hidden for long?"

"Ronruad is full of Haguan's boltholes." Iriad gave her her lunch, collected the empty containers, and departed.

He came back several meals later, to supervise her transferral from the cell to a packing crate. Under guns, Chee obeyed his instructions. She was strapped into padding, alongside an air unit, and left in darkness. There followed hours of maneuver, landing, waiting, being unloaded and trucked to some destination.

Finally the box was opened. Chee emerged slowly. Weight was less than half a standard G, but her muscles were cramped. A pair of workers bore the crate away. Guards stayed behind, with a Merseian who claimed to be a medic. The checkup he gave her was expert and sophisticated enough to bear him out. He said she should rest a while, and they left her alone.

Her suite was interior but luxurious. The food brought her was excellent. She curled in bed and told herself to sleep.

Eventually she was taken down a long, paneled corridor and up a spiral ramp to meet him who had ordered her caught.

He squatted behind a desk of dark, polished wood that looked a hectare in area. Thick white fur carpeted the room and muffled footsteps. Pictures glowed, music sighed, incense sweetened the air. Windows gave a view outside; this part of the warren projected aboveground. Chee saw ruddy sand, strange wild shrubbery, a dust storm walking across a gaunt range of hills and crowned with ice crystals. Korych stood near the horizon, shrunken, but fierce through the tenuous atmosphere. A few stars also shone in that purple sky. Chee recognized Valenderay, and shivered a little. So bright and steady it looked; and yet, at this moment, death was riding from it on the wings of light.

"Greeting, galactic." The Eriau was accented differently from Olgor's. "I am Haguan Eluatz. Your name, I gather, is Chee Lan."

She arched her back, bottled her tail, and spat. But she felt very helpless. The Merseian was huge, with a belly that bulged forward his embroidered robe. He was not of the Wilwidh stock, his skin was shiny black and heavily scaled, his eyes almond-shaped, his nose a scimitar.

One ring-glittering hand made a gesture. Chee's guards slapped tails to ankles and left. The door closed behind them. But a pistol lay on Haguan's desk, next to an intercom.

He smiled. "Be not afraid. No harm is intended you. We regret the indignities you have suffered and will try to make amends. Sheer necessity forced us to act."

"The necessity for suicide?" Chee snorted.

"For survival. Now why don't

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you make yourself comfortable on yonder couch? We have talk to forge, we two. I can send for whatever refreshment you desire. Some arthberry wine, perhaps?"

Chee shook her head, but did jump onto the seat. "Suppose you explain your abominable behavior," she said.

"Gladly." Haguan shifted the weight on his tail. "You may not know what the Gethfennu is. It came into being after the first galactics had departed. But by now—" He continued for a while. When he spoke of a system-wide syndicate, controlling millions of lives and uncounted wealth, strong enough to build its own city on this planet and clever enough to play its enemies off against each other so that none dared attack that colony: he was scarcely lying. Everything that Chee had seen confirmed it.

"Are we in this town of yours now?" she asked.

"No. Elsewhere on Ronruad. Best I not be specific. I have too much respect for your cleverness."

"And I have none for yours."

"Khraich? You must. I think we operated quite smoothly, and on such short notice. Of course, an organization like ours must always be prepared for anything. And we have been on special alert ever since your arrival. What little we have learned —" Haguan's gaze went to the white point of Valenderay and lingered. "That star, it is going to explode. True?"

"Yes. Your civilization will be scrubbed out unless—"

"I know, I know. We have scientists in our pay." Haguan leaned forward. "The assorted governments on Merseia see this as a millennial chance to rid themselves of the troublesome Gethfennu. We need only be denied help in saving our colony, our shipping, our properties on the home planet and elsewhere. Then we are finished. I expect you galactics would agree to this. Since not everything can be shielded in time, why not include us in that which is to be abandoned? You stand for some kind of law and order too, I suppose."

Chee nodded. In their mask of dark fur, her eyes smoldered emerald. Haguan had guessed shrewdly. The League didn't much care who it dealt with, but the solid citizens whose taxes were to finance the majority of the rescue operations did.

"So to win our friendship, you take me by force," she sneered halfheartedly.

"What had we to lose? We might have conferred with you, pleaded our cause, but would that have wrought good for us?"

"Suppose my partners recommend that no help be given your whole coprophagous Merseian race."

"Why, then the collapse comes," Haguan said with chilling calm, "and the Gethfennu has a better chance than most organizations of improving its relative position. But

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I doubt that any such recommendation will be made, or that your overlords would heed it if it were.

"So we need a coin to buy technical assistance. You."

Chee's whiskers twitched in a smile of sorts. "I'm scarcely that big a hostage."

"Probably not," Haguan agreed. "But you are a source of information."

The Cynthian's fur stood on end with alarm. "Do you have some skewbrained notion that I can tell you how to do everything for yourself? I'm not even an engineer!"

"Understood. But surely you know your way about in your own civilization. You know what the engineers can and cannot do. More important, you know the planets, the different races and cultures upon them, the mores, the laws, the needs. You can tell us what to expect. You can help us get interstellar ships—hijacking under your advice should succeed, being unlooked for—and show us how to pilot them, and put us in touch with someone who, for pay, will come to our aid."

"If you suppose for a moment that the Polesotechnic League would tolerate—"

Teeth flashed white in Haguan's face. "Perhaps it won't, perhaps it will. With so many stars, the diversity of peoples and interests is surely inconceivable. The Gethfennu is skilled in stirring up competition among others. What information you supply will tell us how, in this particular case. I don't really visualize your League, whatever it is, fighting a war—at a time when every resource must be devoted to saving Merseia—to prevent someone else rescuing us."

He spread his hands. "Or possibly we'll find a different approach," he finished. "It depends on what you tell and suggest."

"How do you know you can trust me?"

Haguan said like iron: "We judge the soil by what crops it bears. If we fail, if we see the Gethfennu doomed, we can still enforce our policy regarding traitors. Would you care to visit my punishment facilities? They are quite extensive. Even though you are of a new species, I think we could keep you alive and aware for many days."

Silence dwelt a while in that room. Korych slipped under the horizon. Instantly the sky was black, strewn with the legions of the stars, beautiful and uncaring.

Haguan switched on a light, to drive away that too enormous vision. "If you save us, however," he said, "you will go free with a very good reward."

"But—" Chee looked sickly into sterile years ahead of her. And the betrayal of friends, and scorn if ever she returned, a lifetime's exile. "You'll keep me till then?"

"Of course."

No success. No ghost of a clue. She was gone into an emptiness less

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fathomable than the spaces which gaped around their ship.

They had striven, Falkayn and Adzel. They had walked into Luridor itself, the sin-bright city on Ronruad, while the ship hovered overhead and showed with a single, rock-fusing flash of energy guns what power menaced the world. They had ransacked, threatened, bribed, beseeched. Sometimes terror met them, sometimes the inborn arrogance of Merseia's lords. But nowhere and never had anyone so much as hinted he knew who held Chee Lan or where.

Falkayn ran a hand through uncombed yellow locks. His eyes stood bloodshot in a sunken countenance. "I still think we should've taken that casino boss aboard and worked him over."

"No," said Adzel. "Apart from the morality of the matter, I feel sure that everyone who has any information is hidden away. That precaution is elementary. We're not even certain the outlaw regime is responsible."

"Yeh. Could be Morruchan, Dagla, Olgor, or colleagues of theirs acting unbeknownst to them, or any of a hundred other governments, or some gang of fanatics, or—Oh, *Judas!*"

Falkayn looked at the after viewscreen. Ronruad's tawny-red crescent was dwindling swiftly among the constellations, as the ship drove at full acceleration back toward Merseia. It was a dwarf planet, an ocherous pebble that would not make a decent splash if it fell into one of the gas giants. But the least of planets is still a world: mountains, plains, valleys, arroyos, caves, waters, square kilometers by the millions, too vast and varied for any mind to grasp. And Merseia was bigger yet; and there were others, and moons, asteroids, space itself.

Chee's captors need but move her around occasionally, and the odds against a fleetful of League detectives finding her would climb for infinity.

"The Merseians themselves are bound to have some notion where to look, what to do, who to put pressure on," he mumbled for the hundredth time. "We don't know the ins and outs. Nobody from our cultures ever will—five billion years of planetary existence to catch up with! We've got to get the Merseians busy. I mean really busy."

"They have their own work to do," Adzel said.

Falkayn expressed himself at pungent length on the value of their work. "How about those enthusiasts?" he wondered when he had calmed down a trifle. "The outfit you were talking to."

"Yes, the Star Believers should be loyal allies," Adzel said. "But most of them are poor and, ah, unrealistic. I hardly expect them to be of help. Indeed, I fear they will complicate our problem by starting pitched battles with the Demonists."

"You mean the anti-galactics?"

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Falkayn rubbed his chin. The bristles made a scratchy noise, in the ceaseless gentle thrum that filled the cabin. He inhaled the sour smell of his own weariness. "Maybe they did this."

"I doubt that. They must be investigated, naturally—a major undertaking in itself—but they do not appear sufficiently well organized."

"Damnation, if we don't get her back I'm going to push for letting this whole race stew!"

"You will not succeed. And in any event, it would be unjust to let millions die for the crime of a few."

"The millions jolly well ought to be tracking down the few. It's possible. There have to be some leads somewhere. If every single one is followed—"

The detector panel flickered. Muddlehead announced: "Ship observed. A chemical carrier, I believe, from the outer system. Range—"

"Oh, dry up," Falkayn said, "and blow away."

"I am not equipped to—"

Falkayn stabbed the voice cutoff button.

He sat for a while, then, staring into the stars. His pipe went out unnoticed between his fingers. Adzel sighed and laid his head down on the deck.

"Poor little Chee," Falkayn whispered at last. "She came a long way to die."

"Most likely she lives," Adzel said.

"I hope so. But she used to go flying through trees, in an endless forest. Being caged will kill her."

"Or unbalance her mind. She is so easily infuriated. If anger can find no object, it turns to feed on itself."

"Well . . . you were always squabbling with her."

"It meant nothing. Afterward she would cook me a special dinner. Once I admired a painting of hers, and she thrust it into my hands and said, 'Take the silly thing, then,' like a cub that is too shy to say it loves you."

"Uh-huh."

The cutoff button popped up. "Course adjustment required," Muddlehead stated, "in order to avoid dangerously close passage by ore carrier."

"Well, do it," Falkayn rasped. "Destruction, but they've got a lot of space traffic!"

"Well, we are in the ecliptic plane, and as yet near Ronruad," Adzel said. "The coincidence is not great."

Falkayn clenched his hands. The pipestem snapped. "Suppose we strafe the ground," he said in a cold strange voice. "Not kill anyone. Burn up a few expensive installations, though, and promise more of the same if they don't get off their duffs and start a real search for her."

"No. We have considerable discretion, but not that much."

"We could argue with the board of inquiry later."

"Such a deed would produce confusion and antagonism, and weaken

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the basis of the rescue effort. It might actually make rescue impossible. You have observed how basic pride is to the dominant Merseian cultures. An attempt to browbeat them, with no face-saving formula possible, might compel them to refuse galactic assistance. We would be personally, criminally responsible. I cannot permit it, David."

"So we can't do anything, not anything, to—"

Falkayn's words chopped off. He smashed a fist down on the arm of his pilot chair and surged to his feet. Adzel rose also, sinews drawn taut. He knew his partner.

Merseia hung immense, shining with oceans, blazoned with clouds and continents, rimmed with dawn and sunset and the deep sapphire of her sky. Her four small moons made a diadem. Korych flamed in plumage of zodiacal light.

Space cruiser *Yonuar*, United Fleet of the Great Vachs, swung close in polar orbit. Officially she was on patrol to stand by for possible aid to distressed civilian vessels. In fact she was there to keep an eye on the warcraft of Lafdigu, Wolder, the Nersan Alliance—any her masters mistrusted. And, yes, on the new-come galactics, if they returned hither. The God alone knew what they intended. One must tread warily and keep weapons close to hand.

On his command bridge, Captain Tryntaf Fangryf-Tamer gazed into the simulacrum tank and tried to imagine what laired among those myriad suns. He had grown up knowing that others flitted freely between them while his people were bound to this one system, and hating that knowledge. Now they were here once again—why? Too many rumors flew about. But most of them centered on the ominous spark called Valenderay.

Help; collaboration; were the Vach Isthyr to become mere clients of some outworld grotesque?

A signal fluted. The intercom said: "Radar Central to captain. Object detected on an intercept path." The figures which followed were unbelievable. No meteoroid, surely, despite an absence of jet radiation. Therefore, the galactics! His black uniform tunic grew taut around Tryntaf's shoulders as he hunched forward and issued orders. Battle stations: not that he was looking for trouble, but he was prudent. And if trouble came, he'd much like to see how well the alien could withstand laser blasts and nuclear rockets.

She grew in his screens, a stubby truncated raindrop, ridiculously tiny against the sea-beast hulk of *Yonuar*. She matched orbit so fast that Tryntaf heard the air suck in through his lips. Doom and death, why wasn't that hull broken apart and the crew smeared into a red layer? Some kind of counterfield . . . The vessel hung a few kilometers off and Tryntaf sought to calm himself. They would no doubt call him,

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and he must remain steady of nerve, cold of brain.

For his sealed orders mentioned that the galactics had left Merseia in anger, because the whole planet would not devote itself to a certain task. The Hands had striven for moderation; of course they would do what they reasonably could to oblige their guests from the stars, but they had other concerns, too. The galactics seemed unable to agree that the business of entire worlds was more important than their private wishes. Of necessity, such an attitude was met with haughtiness, lest the name of the Vachs, of all the nations, be lowered.

Thus, when his outercom screen gave him an image, Tryntaf kept one finger on the combat button. He had some difficulty hiding his revulsion. Those thin features, shock of hair, tailless body, fuzzed brown skin, were like a dirty caricature of Merseiankind. He would rather have spoken to the companion, whom he could see in the background. That creature was honestly weird.

Nonetheless, Tryntaf got through the usual courtesies and asked the galactic's business in a level tone.

Falkayn had pretty well mastered modern language by now. "Captain," he said, "I regret this and apologize, but you'll have to return to base."

Tryntaf's heart slammed. Only his harness prevented him from jerking backward, to drift across the bridge in the dreamlike flight of zero gravity. He swallowed and managed to keep his speech calm. "What is the reason?"

"We have communicated it to different leaders," said Falkayn, "but since they don't accept the idea, I'll also explain to you personally.

"Someone, we don't know who, has kidnapped a crew member of ours. I'm sure that you, Captain, will understand that honor requires we get her back."

"I do," Tryntaf said, "and honor demands that we assist you. But what has this to do with my ship?"

"Let me go on, please. I want to prove that no offense is intended. We have little time to make ready for the coming disaster, and few personnel to employ. The contribution of each is vital. In particular, the specialized knowledge of our vanished teammate cannot be dispensed with. So her return is of the utmost importance to all Merseians."

Tryntaf grunted. He knew the argument was specious, meant to provide nothing but an acceptable way for his people to capitulate to the strangers' will.

"The search for her looks hopeless when she can be moved about in space." Falkayn said. "Accordingly, while she is missing, interplanetary traffic must be halted."

Tryntaf rapped an oath. "Impossible."

"Contrariwise," Falkayn said.

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"We hope for your cooperation, but if your duty forbids this, we two can enforce the decree."

Tryntaf was astonished to hear himself, through a tide of fury, say just: "I have no such orders."

"That is regrettable," Falkayn said. "I know your superiors will issue them, but that takes time and the emergency will not wait. Be so good as to return to base."

Tryntaf's finger poised over the button. "And if I don't?"

"Captain, we shouldn't risk damage to your fine ship—"

Tryntaf gave the signal.

His gunners had the range. Beams and rockets vomited forth.

Not one missile hit. The enemy flitted aside, letting them pass, as if they were thrown pebbles. A full-power ray struck: but not her hull. Energy sparked and showered blindingly off some invisible barrier.

The little vessel curved about like an aircraft. One beam licked briefly from her snout. Alarms resounded. Damage Control cried, near hysteria, that armorplate had been sliced off as a knife might cut soft wood. No great harm done; but if the shot had been directed at the reaction-mass tanks—

"How very distressing, Captain," Falkayn said. "But accidents will happen when weapons systems are overly automated, don't you agree? For the sake of your crew, for the sake of your country whose ship is your responsibility, I do urge you to reconsider."

"Hold fire," Tryntaf gasped.

"You will return planetside, then?" Falkayn asked.

"I curse you, yes," Tryntaf said with a parched mouth.

"Good. You are a wise male, Captain. I salute you. Ah . . . you may wish to notify your fellow commanders elsewhere, so they can take steps to assure there will be no further accidents. Meanwhile, though, please commence re-entry."

Jets stabbed into space. *Yonuar*, pride of the Vachs, began her inward spiral.

And aboard *Muddlin' Through*, Falkayn wiped his brow and grinned shakily at Adzel. "For a minute," he said, "I was afraid that moron was going to slug it out."

"We could have disabled his command with no casualties," Adzel said, "and I believe they have lifecraft."

"Yes, but think of the waste; and the grudge." Falkayn shook himself. "Come on, let's get started. We've a lot of others to round up."

"Can we—a lone civilian craft—blockade an entire globe?" Adzel wondered. "I do not recall that it has ever been done."

"No, I don't imagine it has. But that's because the opposition has also had things like grav drive. These Merseian rowboats are something else again. And we need only watch this one planet. Everything funnels through it." Falkayn stuffed tobacco into a pipe. "Uh, Adzel, suppose you compose our broadcast to the

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public. You're more tactful than I am."

"What shall I say?" the Wodenite asked.

"Oh, the same guff as I just forked out, but dressed up and tied with a pink ribbon."

"Do you really expect this to work, David?"

"I've pretty high hopes. Look, all we'll call for is that Chee be left some safe place and we be notified where. We'll disavow every intention of punishing anybody, and we can make that plausible by pointing out that the galactics have to prove they're as good as their word if their mission is to have any chance of succeeding. If the kidnappers don't oblige—Well, first, they'll have the entire population out on a full-time hunt after them. And second, they themselves will be suffering badly from the blockade meanwhile. Whoever they are. Because you wouldn't have as much interplanetary shipping as you do, if it weren't basic to the economy."

Adzel shifted in unease. "We must not cause anyone to starve."

"We won't. Food isn't sent across space, except gourmet items; too costly. How often do I have to explain to you, old thickhead? What we will cause is that everybody loses money. Megacredits per diem. And Very Important Merseians will be stranded in places like Luridor, and they'll burn up the maser beams ordering their subordinates to remedy that state of affairs. And factories will shut down, spaceports lie idle, investments crumble, political and military balances get upset . . . You can fill in the details."

Falkayn lit his pipe and puffed a blue cloud. "I don't expect matters will go that far, actually," he went on. "The Merseians are as able as us to foresee the consequences. Not a hypothetical disaster three years hence, but money and power eroding away right now. So they'll put it first on their agenda to find those kidnappers and take out resentment on them. The kidnappers will know this and will also, I trust, be hit in their personal breadbasket. I bet in a few days they'll offer to swap Chee for an amnesty."

"Which I trust we will honor," Adzel said.

"I told you we'll have to. Wish we didn't."

"Please don't be so cynical, David. I hate to see you lose merit."

Falkayn chuckled. "But I make profits. Come on, Muddlehead, get busy and find us another ship."

The teleconference room in Castle Afon could handle a sealed circuit that embraced the world. On this day it did.

Falkayn sat in a chair he had brought, looking across a table scarred by the daggers of ancestral warriors, to the mosaic of screens which filled the opposite wall. A hundred or more Merseian visages lowered back at him. On that scale, they had no individuality. Save one:

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a black countenance ringed by empty frames. No lord would let his image stand next to that of Haguan Eluatz.

Beside the human, Morruchan, Hand of the Vach Dathyr, rose and said with frigid ceremoniousness: "In the name of the God and the blood, we are met. May we be well met. May wisdom and honor stand shield to shield . . ." Falkayn listened with half an ear. He was busy rehearsing his speech. At best, he was in for a cobalt bomb's worth of trouble.

No danger, of course. *Muddlin' Through* hung plain in sight above Ardaig. Television carried that picture around Merseia. And it linked him to Adzel and Chee Lan, who waited at the guns. He was protected.

But what he had to say could provoke a wrath so great that his mission was wrecked. He must say it with infinite care, and then he must hope.

". . . Obligation to a guest demands we hear him out," Morruchan finished brusquely.

Falkayn stood up. He knew that in those eyes he was a monster, whose motivations were not understandable and who had proven himself dangerous. So he had dressed in his plainest gray zipsuit, and was unarmed, and spoke in soft words.

"Worthies," he said, "forgive me that I do not use your titles, for you are of many ranks and nations. But you are those who decide for your whole race. I hope you will feel free to talk as frankly as I shall. This is a secret and informal conference, intended to explore what is best for Merseia.

"Let me first express my heartfelt gratitude for your selfless and successful labors to get my teammate returned unharmed. And let me also thank you for indulging my wish that the, uh, chieftain Haguan Eluatz participate in this honorable assembly, albeit he has no right under law to do so. The reason shall soon be explained. Let me, finally, once again express my regret at the necessity of stopping your space commerce, for however brief a period, and my thanks for your cooperation in this emergency measure. I hope that you will consider any losses made good, when my people arrive to help you rescue your civilization.

"Now, then, it is time we put away whatever is past and look to the future. Our duty is to organize that great task. And the problem is, how shall it be organized? The galactic technologists do not wish to usurp any Merseian authority. In fact, they could not. They will be too few, too foreign, and too busy. If they are to do their work in the short time available, they must accept the guidance of the powers that be. They must make heavy use of existing facilities. That, of course, must be authorized by those who control the facilities. I need not elaborate. Experienced leaders like

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yourselves, worthies, can easily grasp what is entailed."

He cleared his throat. "A major question, obviously, is: With whom shall our people work most closely? They have no desire to discriminate. Everyone will be consulted, within the sphere of his time-honored prerogatives. Everyone will be aided, as far as possible. Yet, plain to see, a committee of the whole would be impossibly large and diverse. For setting overall policy, our people require a small, unified Merseian council, whom they can get to know really well and with whom they can develop effective decision-making procedures.

"Furthermore, the resources of this entire system must be used in a coordinated way. For example, Country One cannot be allowed to hoard minerals which Country Two needs. Shipping must be free to go from any point to any other. And all available shipping must be pressed into service. We can furnish radiation screens for your vessels, but we cannot furnish the vessels themselves in the numbers that are needed. Yet at the same time, a certain amount of ordinary activity must continue. People will still have to eat, for instance. So—how do we make a fair allocation of resources and establish a fair system of priorities?

"I think these considerations make it obvious to you, worthies, that an international organization is absolutely essential, one which can *impartially* supply information, advice, and coordination. If it has facilities and workers of its own, so much the better.

"Would that such an organization had legal existence! But it does not, and I doubt there is time to form one. If you will pardon me for saying so, worthies, Merseia is burdened with too many old hatreds and jealousies to join overnight in brotherhood. In fact, the international group must be watched carefully, lest it try to aggrandize itself or diminish others. We galactics can do this with one organization. We cannot with a hundred.

"So." Falkayn longed for his pipe. Sweat prickled his skin. "I have no plenipotentiary writ. My team is merely supposed to make recommendations. But the matter is so urgent that whatever scheme we propose will likely be adopted, for the sake of getting on with the job. And we have found one group which transcends the rest. It pays no attention to barriers between people and people. It is large, powerful, rich, disciplined, efficient. It is not exactly what my civilization would prefer as its chief instrument for the deliverance of Merseia. We would honestly rather it went down the drain, instead of becoming yet more firmly entrenched. But we have a saying that necessity knows no law."

He could feel the tension gather, like a thunderstorm boiling up; he said fast, before the explosion came: "I refer to the Gethfennu."

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What followed was indescribable.

But he was, after all, only warning of what his report would be. He could point out that he bore a grudge of his own, and was setting it aside for the common good. He could even, with considerable enjoyment, throw some imaginative remarks about ancestry and habits in the direction of Haguan—who grinned and looked smug. In the end, hours later, the assembly agreed to take the proposal under advisement. Falkayn knew what the upshot would be. Merseia had no choice.

The screens blanked.

Wet, shaking, exhausted, he looked across a stillness into the face of Morruchan Long-Ax. The Hand loomed over him. Fingers twitched longingly near a pistol butt. Morruchan said, biting off each word: "I trust you realize what you are doing. You're not just perpetuating that gang. You're conferring legitimacy on them. They will be able to claim they are now a part of recognized society."

"Won't they, then, have to conform to its laws?" Falkayn's larynx hurt, his voice was husky.

"Not them!" Morruchan stood brooding a moment. "But a reckoning will come. The Vachs will prepare one, if nobody else does. And afterward—Are you going to teach us how to build stargoing ships?"

"Not if I have any say in the matter," Falkayn replied.

"Another score. Not important in the long run. We're bound to learn a great deal else, and on that basis . . . well, galactic, our grandchildren will see."

"Is ordinary gratitude beneath your dignity?"

"No. There'll be enough soft-souled dreambuilders, also among my race, for an orgy of sentimentalism. But then you'll go home again. I will abide."

Falkayn was too tired to argue. He made his formal farewells and called the ship to come get him.

Later, hurtling through the interstellar night, he listened to Chee's tirade: ". . . I still have to get back at those greasepaws. They'll be sorry they ever touched me."

"You don't aim to return, do you?" Falkayn asked.

"Pox, no!" she said. "But the engineers on Merseia will need recreation. The Gethfennu will supply some of it, gambling, especially, I imagine. Now if I suggest our lads carry certain miniaturized gadgets which can, for instance, control a wheel—"

Adzel sighed. "In this splendid and terrible cosmos," he said, "why must we living creatures be forever perverse?"

A smile tugged at Falkayn's mouth. "We wouldn't have so much fun otherwise," he said.

Men and not-men were still at work when the supernova wave front reached Merseia.

Suddenly the star filled the south-

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ern night, a third as brilliant as Korych, too savage for the naked eye to look at. Blue-white radiance flooded the land, shadows were etched sharp, trees and hills stood as if illuminated by lightning. Wings beat upward from forests, animals cried through the troubled air, drums pulsed and prayers lifted in villages which once had feared the dark for which they now longed. The day that followed was lurid and furious.

Over the months, the star faded, until it became a knifekeen point and scarcely visible when the sun was aloft. But it waxed in beauty, for its radiance excited the gas around it, so that it gleamed amidst a whiteness which deepened at the edge to blue-violet and a nebular lacework which shone with a hundred faerie hues. Thence also, in Merseia's heaven, streamed huge shuddering banners of aurora, whose whisper was heard even on the ground. An odor of storm was blown on every wind.

Then the nuclear rain began. And nothing was funny any longer. ■

In times to come

Next month's lead story is "Pioneer Trip," by Joe Poyer—cover by Kelly Freas.

We've been talking about that first trip to Mars in these pages for some thirty-five years now; it looks like we don't have much more time to speculate about it. A few years longer than we can speculate about the first manned Moon landing—but not much. We can't speculate about the nature of the Moon's surface with the freedom we had a year ago.

But there's a basic law—or maybe it's just a description—of pioneering. The business of pioneering involves discovering new and unexpected ways to die.

Now death is always a personal tragedy—but death in a pioneer spaceship is something much more. It has the potential of being a major political tragedy, and an economic disaster, unless it is handled *juuuuust* right . . .

THE EDITOR

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A Criminal Act

A criminal act is,
by definition, something that's against the law.
George Washington was a criminal; Hitler was not . . .
because he passed laws before he acted.
That a thing is legal doesn't guarantee either
that it's good or evil.

HARRY HARRISON

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The first blow of the hammer shook the door in its frame, and the second blow made the thin wood boom like a drum. Benedict Vernall threw the door open before a third stroke could fall and pushed his gun into the stomach of the man with the hammer.

"Get going. Get out of here," Benedict said, in a much shriller voice than he had planned to use.

"Don't be foolish," the bailiff said quietly, stepping aside so that the two guards behind him in the hall were clearly visible. "I am the bailiff and I am doing my duty. If I am attacked these men have orders to shoot you and everyone else in your apartment. Be intelligent. Yours is not the first case like this. Such things are planned for."

One of the guards clicked off the safety catch on his submachine gun, smirking at Benedict as he did it. Benedict let the pistol fall slowly to his side.

"Much better," the bailiff told him and struck the nail once more with the hammer so that the notice was fixed firmly to the door.

"Take that filthy thing down," Benedict said, choking over the words.

"Benedict Vernall," the bailiff said, adjusting his glasses on his nose as he read from the proclamation he had just posted. "This is to inform you that pursuant to the Criminal Birth Act of 1993 you are guilty of the act of criminal birth and are hereby proscribed and no longer protected from bodily injury by the forces of this sovereign state . . ."

"You're going to let some madman kill me . . . what kind of a dirty law is that?"

The bailiff removed his glasses and gazed coldly along his nose at Benedict. "Mr. Vernall," he said, "have the decency to accept the results of your own actions. Did you or did you not have an illegal baby?"

"Illegal—never! A harmless infant . . ."

"Do you or do you not already have the legal maximum of two children?"

"We have two, but . . ."

"You refused advice or aid from your local birth-control clinic. You expelled, with force, the birth guidance officer who called upon you. You rejected the offer of the abortion clinic . . ."

"Murderers!"

". . . And the advice of the Family Planning Board. The statutory six months have elapsed without any action on your part. You have had the three advance warnings and have ignored them. Your family still contains one consumer more than is prescribed by law, therefore the proclamation has been posted. You alone are responsible, Mr. Vernall, you can blame no one else."

"I can blame this foul law."

"It is the law of the land," the bailiff said, drawing himself up sternly. "It is not for you or I to

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question." He took a whistle from his pocket and raised it to his mouth. "It is my legal duty to remind you that you still have one course open, even at this last moment, and may still avail yourself of the services of the Euthanasia Clinic."

"Go straight to Hell!"

"Indeed. I've been told that before." The bailiff snapped the whistle to his lips and blew a shrill blast. He almost smiled as Benedict slammed shut the apartment door.

There was an animal-throated roar from the stairwell as the policemen who were blocking it stepped aside. A knot of fiercely tangled men burst out, running and fighting at the same time. One of them surged ahead of the pack but fell as a fist caught him on the side of the head; the others trampled him underfoot. Shouting and cursing the mob came on and it looked as though it would be a draw, but a few yards short of the door one of the leaders tripped and brought two others down. A short fat man in the second rank leaped their bodies and crashed headlong into Vernall's door with such force that the ballpoint pen he held extended pierced the paper of the notice and sank into the wood beneath.

"A volunteer has been selected," the bailiff shouted and the waiting police and guards closed in on the wailing men and began to force them back towards the stairs. One of the men remained behind on the floor, saliva running down his cheeks as he chewed hysterically at a strip of the threadbare carpet. Two white-garbed hospital attendants were looking out for this sort of thing and one of them jabbed the man expertly in the neck with a hypodermic needle while the other unrolled the stretcher.

Under the bailiff's watchful eye the volunteer painstakingly wrote his name in the correct space on the proclamation, then carefully put the pen back in his vest pocket.

"Very glad to accept you as a volunteer for this important public duty, Mr. . . ." the bailiff leaned forward to peer at the paper, "Mr. Mortimer," he said.

"Mortimer is my first name," the man said in a soft dry voice as he dabbed lightly at his forehead with his breast-pocket handkerchief.

"Understandable, sir, your anonymity will be respected as is the right of all volunteers. Might I presume that you are acquainted with the rest of the regulations?"

"You may. Paragraph 46 of the Criminal Birth Act of 1993, subsection 14, governing the selection of volunteers. Firstly, I have volunteered for the maximum period of twenty-four hours. Secondly, I will neither attempt nor commit violence of any form upon any other members of the public during this time, and if I do so I will be held responsible by law for my acts."

"Very good. But isn't there more?"

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Mortimer folded the handkerchief precisely and tucked it back into his pocket. "Thirdly," he said, and patted it smooth, "I shall not be liable to prosecution by law if I take the life of the proscribed individual, one Benedict Vernall."

"Perfectly correct." The bailiff nodded and pointed to a large suitcase that a policeman had set down on the floor and was opening. The hall had been cleared. "If you would step over here and take your choice." They both gazed down into the suitcase that was filled to overflowing with instruments of death. "I hope you also understand that your own life will be in jeopardy during this period and if you are injured or killed you will not be protected by law?"

"Don't take me for a fool," Mortimer said curtly, then pointed into the suitcase. "I want one of those concussion grenades."

"You cannot have it," the bailiff told him in a cutting voice, injured by the other's manner. There was a correct way to do these things. "Those are only for use in open districts where the innocent cannot be injured. Not in an apartment building. You have your choice of all the short-range weapons, however."

Mortimer laced his fingers together and stood with his head bowed, almost in the attitude of prayer, as he examined the contents. Machine pistols, grenades, automatics, knives, knuckle dusters, vials of acid, whips, straight razors, broken glass, poison darts, morning stars, maces, gas bombs and tear-gas pens.

"Is there any limit?" he asked.

"Take what you feel you will need. Just remember that it must all be accounted for and returned."

"I want the Reisling machine pistol with five of the twenty cartridge magazines and the commando knife with the spikes on the handguard and fountain pen tear-gas gun."

The bailiff was making quick check marks on a mimeographed form attached to his clipboard while Mortimer spoke. "Is that all?" he asked.

Mortimer nodded and took the extended board and scrawled his name on the bottom of the sheet without examining it, then began at once to fill his pockets with the weapons and ammunition.

"Twenty-four hours," the bailiff said, looking at his watch and filling in one more space in the form. "You have until 1745 hours tomorrow."

"Get away from the door, please, Ben," Maria begged.

"Quiet," Benedict whispered, his ear pressed to the panel. "I want to hear what they are saying." His face screwed up as he struggled to understand the muffled voices. "It's no good," he said, turning away, "I can't make it out. Not that it makes any difference. I know what's happening . . ."

"There's a man coming to kill

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you," Maria said in her delicate, little girl's voice. The baby started to whimper and she hugged him to her.

"Please, Maria, go back into the bathroom like we agreed. You have the bed in there, and the food, and there aren't any windows. As long as you stay along the wall away from the door nothing can possibly happen to you. Do that for me, darling—so I won't have to worry about either of you."

"Then you will be out here alone."

Benedict squared his narrow shoulders and clutched the pistol firmly. "That is where I belong, out in front, defending my family. That is as old as the history of man."

"Family," she said and looked around worriedly. "What about Matthew and Agnes?"

"They'll be all right with your mother. She promised to look after them until we got in touch with her again. You can still be there with them, I wish you would."

"No, I couldn't. I couldn't bear being anywhere else now. And I couldn't leave the baby there, he would be so hungry." She looked down at the infant who was still whimpering, then began to unbutton the top of her dress.

"Please, darling," Benedict said, edging back from the door. "I want you to go into the bathroom with the baby and stay there. You must. He could be coming at any time now."

She reluctantly obeyed him, and he waited until the door had closed and he heard the lock being turned. Then he tried to force their presence from his mind because they were only a distraction that could interfere with what must be done. He had worked out the details of his plan of defense long before and he went slowly around the apartment making sure that everything was as it should be. First the front door, the only door into the apartment. It was locked and bolted and the night chain was attached. All that remained was to push the big wardrobe up against it. The killer could not enter now without a noisy struggle, and if he tried Benedict would be there waiting with his gun. That took care of the door.

There were no windows in either the kitchen or the bathroom, so he could forget about these rooms. The bedroom was a possibility since its window looked out onto the fire escape, but he had a plan for this, too. The window was locked and the only way it could be opened from the outside was by breaking the glass. He would hear that and would have time to push the couch in the hall up against the bedroom door. He didn't want to block it now in case he had to retreat into the bedroom himself.

Only one room remained, the living room, and this was where he was going to make his stand. There were two windows in the living room and the far one could be entered from the fire escape, as could the bedroom window. The killer might

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come this way. The other window could not be reached from the fire escape, though shots could still be fired through it from the windows across the court. But the corner was out of the line of fire, and this was where he would be. He had pushed the big armchair right up against the wall and, after checking once more that both windows were locked, he dropped into it.

His gun rested on his lap and pointed at the far window by the fire escape. He would shoot if anyone tried to come through it. The other window was close by, but no harm could come that way unless he stood in front of it. The thin fabric curtains were drawn and once it was dark he could see through them without being seen himself. By shifting the gun barrel a few degrees he could cover the door into the hall. If there were any disturbance at the front door he could be there in a few steps. He had done everything he could. He settled back into the chair.

Once the daylight faded the room was quite dark, yet he could see well enough by the light of the city sky that filtered in through the drawn curtains. It was very quiet and whenever he shifted position he could hear the rusty chair springs twang beneath him. After only a few hours he realized one slight flaw in his plan. He was thirsty.

At first he could ignore it, but by nine o'clock his mouth was as dry as cotton wool. He knew he couldn't last the night like this, it was too distracting. He should have brought a jug of water in with him. The wisest thing would be to go and get it as soon as possible, yet he did not want to leave the protection of the corner. He had heard nothing of the killer and this only made him more concerned about his unseen presence.

Then he heard Maria calling to him. Very softly at first, then louder and louder. She was worried. Was he all right? He dared not answer her, not from here. The only thing to do was to go to her, whisper through the door that everything was fine and that she should be quiet. Perhaps then she would go to sleep. And he could get some water in the kitchen and bring it back.

As quietly as he could he rose and stretched his stiff legs, keeping his eyes on the gray square of the second window. Putting the toe of one foot against the heel of the other he pulled his shoes off, then went on silent tiptoe across the room. Maria was calling louder now, rattling at the bathroom door, and he had to silence her. Why couldn't she realize the danger she was putting him in?

As he passed through the door the hall light above him came on.

"What are you doing?" he screamed at Maria who stood by the switch, blinking in the sudden glare.

"I was so worried . . ."

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The crash of breaking glass from the living room was punctuated by the hammering boom of the machine pistol. Arrows of pain tore at Benedict and he hurled himself sprawling into the hall.

"Into the bathroom!" he screeched and fired his own revolver back through the dark doorway.

He was only half aware of Maria's muffled squeal as she slammed the door and, for the moment, he forgot the pain of the wounds. There was the metallic smell of burnt gunpowder and a blue haze hung in the air. Something scraped in the living room and he fired again into the darkness. He winced as the answering fire crashed thunder and flame towards him and the bullets tore holes in the plaster of the hall opposite the door.

The firing stopped but he kept his gun pointed as he realized that the killer's fire couldn't reach him where he lay against the wall away from the open doorway. The man would have to come into the hall to shoot him and if he did that Benedict would fire first and kill him. More shots slammed into the wall, but he did not bother to answer them. When the silence stretched out for more than a minute he took a chance and silently broke his revolver and pulled out the empty shells, putting live cartridges in their place. There was a pool of blood under his leg.

Keeping the gun pointed at the doorway he clumsily rolled up his pants leg with his left hand, then took a quick glimpse. There was more blood running down his ankle and sopping his sock. A bullet had torn through his calf muscle and made two round, dark holes from which the thick blood pumped. It made him dizzy to look at, then he remembered and pointed the wavering pistol back at the doorway. The living room was silent. His side hurt, too, but when he pulled his shirt out of his trousers and looked he realized although this wound was painful, it was not as bad as the one in his leg. A second bullet had burned along his side, glancing off the ribs and leaving a shallow wound It wasn't bleeding badly. Something would have to be done about his leg.

"You moved fast, Benedict, I must congratulate you—"

Benedict's finger contracted with shock and he pumped two bullets into the room, towards the sound of the man's voice. The man laughed.

"Nerves, Benedict, nerves. Just because I am here to kill you doesn't mean that we can't talk."

"You're a filthy beast, a foul, filthy beast!" Benedict splattered the words from his lips and followed them with a string of obscenities, expressions he hadn't used or even heard since his school days. He stopped suddenly as he realized that Maria could hear him. She had never heard him curse before.

"Nerves, Benedict?" The dry laugh sounded again. "Calling me

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insulting names won't alter this situation."

"Why don't you leave, I won't try to stop you," Benedict said as he slowly pulled his left arm out of his shirt. "I don't want to see you or know you. Why don't you go away?"

"I'm afraid that it is not that easy, Ben. You have created this situation, in one sense you have called me here. Like a sorcerer summoning some evil genie. That's a pleasant simile, isn't it? May I introduce myself. My name is Mortimer."

"I don't want to know your name, you . . . piece of filth." Benedict half-mumbled, his attention concentrated on the silent removal of his shirt. It hung from his right wrist and he shifted the gun to his left hand for a moment while he slipped it off. His leg throbbed with pain when he draped it over the wound in his calf and he gasped, then spoke quickly to disguise the sound. "You came here because you wanted to —and I'm going to kill you for that."

"Very good, Benedict, that is much more the type of spirit I expected from you. After all you are the closest we can come to a dedicated lawbreaker these days, the antisocial individualist who stands alone, who will carry on the traditions of the Dillingers and the James brothers. Though they brought death and you brought life, and your weapon is far humbler than their guns and their . . ." The words ended with a dry chuckle.

"You have a warped mind, Mortimer, just what I would suspect of a man who accepts a free license to kill. You're sick."

Benedict wanted to keep the other man talking, at least for a few minutes more until he could bandage his leg. The shirt was sticky with blood and he couldn't knot it right with his left hand. "You must be sick to come here," he said. "What other reason could you possibly have?" He laid the gun down silently, then fumbled with haste to bandage the wound.

"Sickness is relative," the voice in the darkness said, "as is crime. Man invents societies and the rules of his invented societies determine the crimes. *O tempora! O mores!* Homosexuals in Periclean Greece were honored men, and respected for their love. Homosexuals in industrial England were shunned and prosecuted for a criminal act. Who commits the crime—society or the man? Which of them is the criminal? You may attempt to argue a higher authority than man, but that would be only an abstract predication and what we are discussing here are realities. The law states that you are a criminal. I am here to enforce that law." The thunder of his gun added punctuation to his words and long splinters of wood flew from the doorframe. Benedict jerked the knot tight and grabbed up his pistol again.

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"I do invoke a higher authority," he said. "Natural law, the sanctity of life, the inviolability of marriage. Under this authority I wed and I love, and my children are the blessings of this union."

"Your blessings—and the blessings of the rest of mankind—are consuming this world like locusts," Mortimer said. "But that is an observation. First, I must deal with your arguments.

"Primus. The only natural law is written in the sedimentary rocks and the spectra of suns. What you call natural law is man-made law and varies with the varieties of religion. Argument invalid.

"Secundis. Life is prolificate and today's generations must die so that tomorrow's may live. All religions have the faces of Janus. They frown at killing and at the same time smile at war and capital punishment. Argument invalid.

"Ultimus. The forms of male and female union are as varied as the societies that harbor them. Argument invalid. Your higher authority does not apply to the world of facts and law. Believe in it if you wish, if it gives you satisfaction, but do not invoke it to condone your criminal acts."

"Criminal!" Benedict shouted, and fired two shots through the doorway, then cringed as an answering storm of bullets crackled by. Dimly, through the bathroom door, he heard the baby crying, awakened by the noise. He dropped out the empty shells and angrily pulled live cartridges from his pocket and jammed them into the cylinder. "You're the criminal who is trying to murder me," he said. "You are the tool of the criminals who invade my house with their unholy laws and tell me I can have no more children. You cannot give me orders about this."

"What a fool you are," Mortimer sighed. "You are a social animal and do not hesitate to accept the benefits of your society. You accept medicine, so your children live now as they would have died in the past, and you accept a ration of food to feed them, food you do not work for. This suits you so you accept. But you do not accept planning for your family and you attempt to reject it. It is impossible. You must accept all or reject all. You must leave your society—or abide by its rules. You eat the food, you must pay the price."

"I don't ask for more food. The baby has its mother's milk, we will share our food ration . . ."

"Don't be fatuous. You and your irresponsible kind have filled this world to bursting with your get, and still you will not stop. You have been reasoned with, railed against, cajoled, bribed and threatened, all to no avail. Now you must be stopped. You have refused all aid to prevent your bringing one more mouth into this hungry world and, since you have done so anyway, you

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are to be held responsible for closing another mouth and removing it from this same world. The law is a humane one, rising out of our history of individualism and the frontier spirit, and gives you a chance to defend your ideals with a gun. And your life."

"The law is not humane," Benedict said. "How can you possibly suggest that. It is harsh, cruel and pointless."

"Quite the contrary, the system makes very good sense. Try and step outside yourself for a moment, forget your prejudices and look at the problem that faces our race. The universe is cruel—but it's not ruthless. The conservation of mass is one of the universe's most ruthlessly enforced laws. We have been insane to ignore it so long, and it is sanity that now forces us to limit the sheer mass of human flesh on this globe. Appeals to reason have never succeeded in slowing the population growth so, with great reluctance, laws have been passed. Love, marriage and the family are not affected—up to a reasonable maximum of children. After that a man *voluntarily* forsakes the protection of society, and must take the consequences of his own acts. If he is insanely selfish, his death will benefit society by ridding it of his presence. If he is not insane and has determination and enough guts to win—well then, he is the sort of man that society needs and he represents a noble contribution to the gene pool. Good and law-abiding citizens are not menaced by these laws."

"How dare you!" Benedict shouted. "Is a poor, helpless mother of an illegitimate baby a criminal?"

"No, only if she refuses all aid. She is even allowed a single child without endangering herself. If she persists in her folly, she must pay for her acts. There are countless frustrated women willing to volunteer for battle to even the score. They, like myself, are on the side of the law and eager to enforce it. So close my mouth, if you can, Benedict, because I look forward with pleasure to closing your incredibly selfish one."

"Madman!" Benedict hissed and felt his teeth grate together with the intensity of his passion. "Scum of society. This obscene law brings forth the insane dregs of humanity and arms them and gives them license to kill."

"It does that, and a useful device it is, too. The maladjusted expose themselves and can be watched. Better the insane killer coming publicly and boldly than trapping and butchering your child in the park. Now he risks his life and whoever is killed serves humanity with his death."

"You admit you are a madman —a licensed killer?" Benedict started to stand but the hall began to spin dizzily and grow dark; he dropped back heavily.

"Not I," Mortimer said toneless-

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ly. "I am a man who wishes to aid the law and wipe out your vile, proliferating kind."

"You're an invert then, hating the love of man and woman."

The only answer was a cold laugh that infuriated Benedict.

"Sick!" he screamed, "or mad. Or sterile, incapable of fathering children of your own and hating those who can . . ."

"That's enough! I've talked enough to you, Benedict. Now I shall kill you."

Benedict could hear anger for the first time in the other's voice and knew that he had goaded the man with the prod of truth. He was silent, sick and weak, the blood still seeping through his rough bandage and widening in a pool on the floor. He had to save what little strength he had to aim and fire when the killer came through the doorway. Behind him he heard the almost silent opening of the bathroom door and the rustle of footsteps. He looked up helplessly into Maria's tearstained face.

"Who's there with you?" Mortimer shouted, from where he crouched behind the armchair. "I hear you whispering. If your wife is there with you, Benedict, send her away. I won't be responsible for the cow's safety. You've brought this upon yourself, Benedict, and the time has now come to pay the price of your errors, and I shall be the instrumentality of that payment."

He stood and emptied the remainder of the magazine of bullets through the doorway, then pressed the button to release the magazine and hurled it after the bullets, clicking a new one instantly into place. With a quick pull he worked the slide to shove a live cartridge into the chamber and crouched, ready to attack.

This was it. He wouldn't need the knife. Walk a few feet forward. Fire through the doorway, then throw in the tear gas pen. It would either blind the man or spoil his aim. Then walk through firing with the trigger jammed down and the bullets spraying like water and the man would be dead. Mortimer took a deep, shuddering breath—then stopped and gaped as Benedict's hand snaked through the doorway and felt its way up the wall.

It was so unexpected that for a moment he didn't fire, and when he did fire he missed. A hand is a difficult target for an automatic weapon. The hand jerked down over the light switch and vanished as the ceiling lights came on.

Mortimer cursed and fired after the hand and fired into the wall and through the doorway, hitting nothing except insensate plaster and feeling terribly exposed beneath the glare of light.

The first shot from the pistol went unheard in the roar of his gun and he did not realize that he was under fire until the second bullet ripped into the floor close to his

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feet. He stopped shooting, spun round and gaped.

On the fire escape outside the broken window stood the woman. Slight and wide-eyed and swaying as though a strong wind tore at her, she pointed the gun at him with both hands and jerked the trigger spasmodically. The bullets came close but did not hit him, and in panic he pulled the machine pistol up, spraying bullets in an arc towards the window. "Don't! I don't want to hurt you!" he shouted even as he did it.

The last of his bullets hit the wall and his gun clicked and locked out of battery as the magazine emptied. He hurled the barren metal magazine away and tried to jam a full one in. The pistol banged again and the bullet hit him in the side and spun him about. When he fell the gun fell from his hand. Benedict, who had been crawling slowly and painfully across the floor reached him at the same moment and clutched at his throat with hungry fingers.

"Don't . . ." Mortimer croaked and thrashed about. He had never learned to fight and did not know what else to do.

"Please, Benedict, don't," Maria said, climbing through the window and running to them. "You're killing him."

"No . . . I'm not," Benedict gasped. "No strength. My hands are too weak."

Looking up he saw the pistol near his head and he reached and tore it from her.

"One less mouth now!" he shouted and pressed the hot muzzle against Mortimer's chest and pulled the trigger. The muffled shot tore into the man who kicked violently once and died.

"Darling, you're all right?" Maria wailed, kneeling and clutching him to her.

"Yes . . . all right. Weak, but that's from loss of blood, I imagine. The bleeding has stopped now. It's all over. We've won. We'll have the food ration now, and they won't bother us any more and everyone will be satisfied."

"I'm so glad," she said, and actually managed to smile through her tears. "I really didn't want to tell you before, not bother you with all this other trouble going on. But there's going to be . . ." She dropped her eyes.

"What?" he asked incredulously. "You can't possibly mean . . ."

"But I do." She patted the rounded mound of her midriff. "Aren't we lucky?"

All he could do was look up at her, his mouth wide and gaping like some helpless fish cast up on the shore. ■

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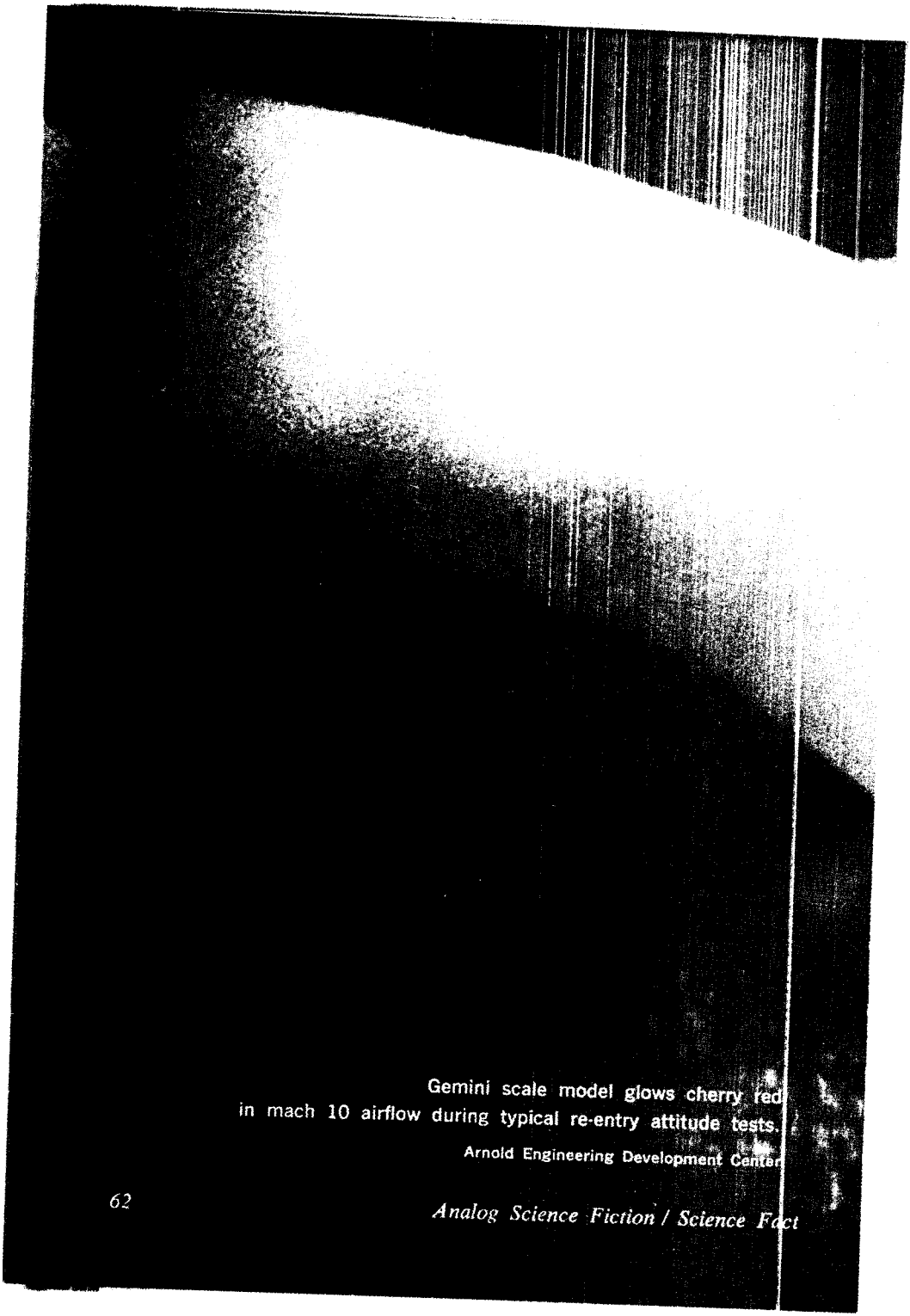

Gemini scale model glows cherry red in mach 10 airflow during typical re-entry attitude tests.

Arnold Engineering Development Center

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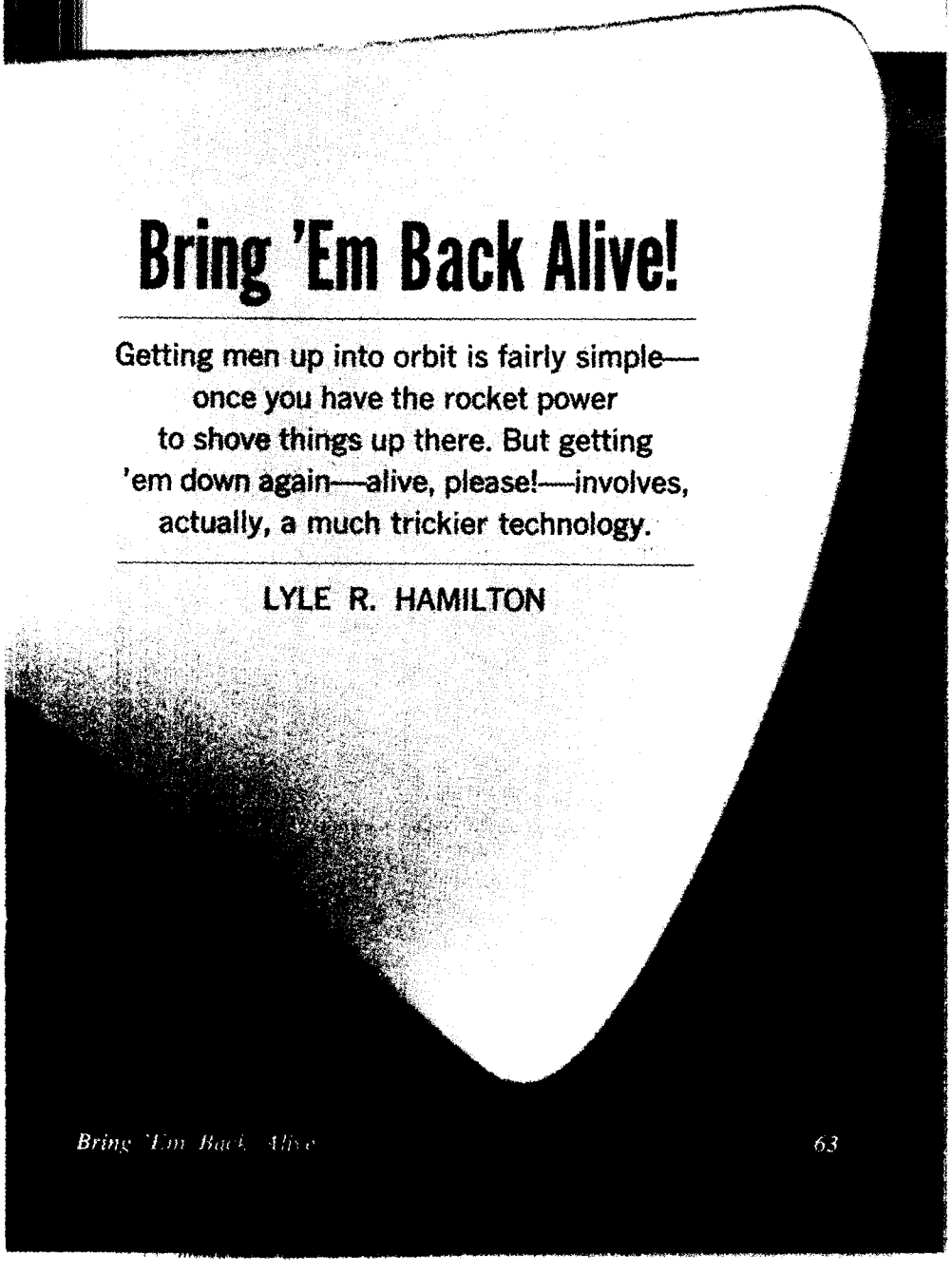
Bring 'Em Back Alive!

Getting men up into orbit is fairly simple—
once you have the rocket power
to shove things up there. But getting
'em down again—alive, please!—involves,
actually, a much trickier technology.

LYLE R. HAMILTON



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In the decade following World War II, few people were interested in manned space research. To most men it seemed another case for, "If God wanted man in space, he'd a give us rockets on the hip." A trite corollary. If we were to smoke, we'd have been born with chimneys in our head; to drink, with funnels in our gullet. (What bothers me about this line of reasoning is that we *were* born nude. And few preachers advocate nudeness.)

Science viewed space from another aspect. To the scientist, space was—in the simplest terms—another medium for travel. A medium that could be understood with a little applied sense.

But more important, space would be a new adventure. An adventure dreamed of by inquisitive men for centuries. Too, we'd learned at least one lesson from history. We'd learned that man advances in proportion to his understanding of his universe.

Space was before us—as it had always been—but now, in this century, we had, within our grasp, the technologies to conquer, to explore and to comprehend.

The problem was, "How do you build a vessel that will go from one medium, atmosphere, into another, space, and back again?"

That's something similar to building a flying submarine. Not impossible, but certainly something of a challenge.

Scientists puzzled over the best way to put *stuff* into space for years. In the late '40s we were told about escape velocities of 24,000 mph and orbiting velocities of 17,000 to 18,000 mph. But there's been some misunderstanding in regard to these speeds. It's possible to put material on the moon by moving it upward at the ridiculously slow speed of one mile per year. With the moon at an average 240,000-mile distance it would take only about 190 kiloyears to put the object within Lunar gravity—at which time it would accelerate toward impact.

Obviously this is a poor approach. The power required is beyond comprehension. In GEMINI's case it would take three and a half tons plus a skosh at lift off.* This thrust would have to continue, although decreasing toward zero with the square of the distance between the spacecraft and earth, for the entire 190 kiloyear period.**

However, if we accelerate that three and a half ton spacecraft to 24,000 mph within the first few moments of flight, the craft will coast near the moon's vicinity and get slurped in by its gravity field. Such a flight would take only two weeks

*Skosh: Military jargon for a small undefined measurement. From the Japanese.

**These are ball park figures. As you know, a ball park has a right and a left field. With the moon's distance averaging 240,000 miles, the equal attraction point is 192,000 miles, 4/5th the distance.

But because the moon has a perigee and apogee—just like other satellites—the equal attraction point is a factor of exact terra-lunar location.

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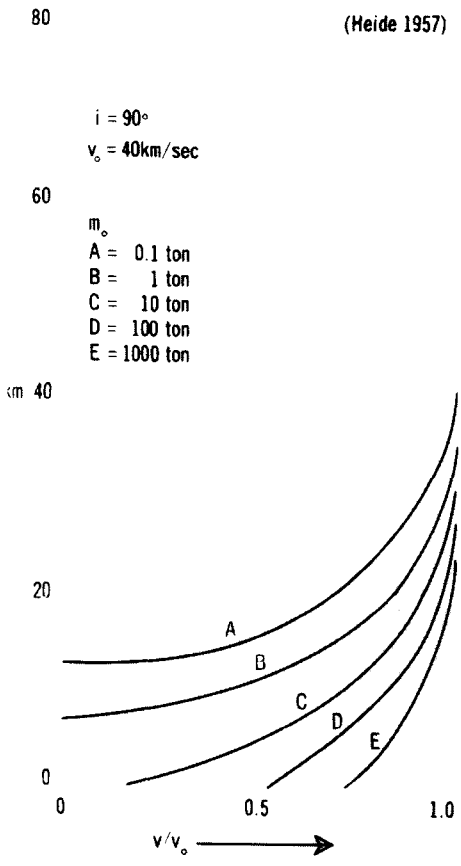

This chart plots the entry of five different meteorites, each having a Cosmic velocity of 40 km/sec. Adapting this natural observation to spacecraft we can see that spacecraft mass will reach a point where it can not be returned via free fall.

for the round trip—including time for sight-seeing. The ship is your hotel.

If the spacecraft is accelerated to the 17,500 mph orbital velocity and placed in a circle concentric with the earth, it will orbit at a distance of about 120 miles.

We must note the important contribution made by Dr. Goddard's rocket. It gives rapid acceleration to these high velocities. And this is exactly where the hitch comes in. The rocket is the cheapest, most efficient method of putting man into space we have developed. Right now it's the only developed technique. Sure antigrav, with cheap atomic fuel will work—only NASA hasn't announced any funding on that project.

So we're stuck with rockets—and a law of physics.

A TITAN II sitting on the launch pad is pure potential energy. Light off that booster—and while it sears skyward—it imparts most of that potential energy to the spacecraft in the form of kinetic energy.

Mass in motion, three and a half tons whirling about the earth at a speed faster than the *Superchief*, swifter than a high-velocity bullet, speeds higher than even the Batmobile.

And before it can return to earth, before those astronauts can spend another weekend at home, visiting with their families, or even enjoying a ticker tape parade, that ki-

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netic energy, every last pound/mph must be expended.

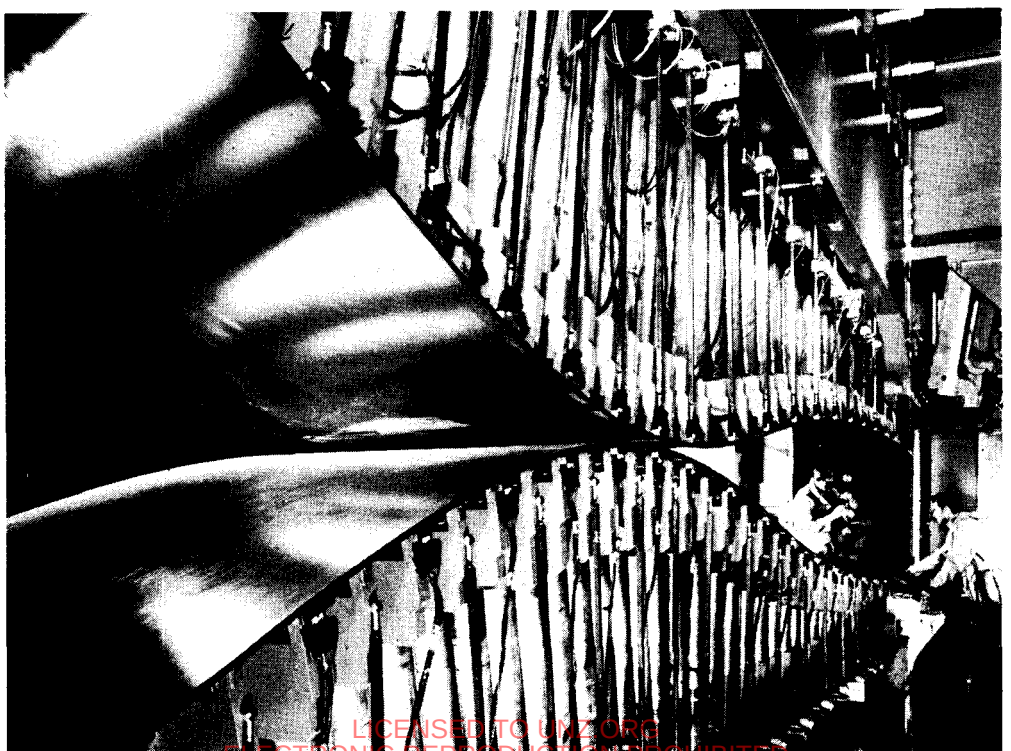
We could compare this to a baseball—a line drive into center field. That ball's got kinetic energy, too. Air friction and gravity pull it groundward, until it strikes the sod, bounces and rolls to a stop. The kinetic energy is fully expended. But, if your team's in the outfield it's a good way to lose the game.

So let's put a *bare handed* fielder into play. The fielder gets in front of the line drive and catches it. Again, the kinetic energy is fully expended—the fielder also suffers a bruised and burned hand. Because in stopping the ball abruptly, the kinetic energy quickly turned into heat—which is why baseball players wear gloves.

The atmosphere lies in a blanket

Supersonic squeeze of this flexible nozzle generates a mach 6 airflow in the 40-inch test section of Tunnel A in the von Karman Gas Dynamics Facility at the USAF's Arnold Engineering Development Center. Sidewall nearest the camera has been rolled back to reveal the flexible nozzle and the hydraulically-actuated jacks which adjust the contours for mach numbers ranging from 1.5 to 6. The tunnel is the largest mach 6 tunnel in existence.

Arnold Engineering Development Center



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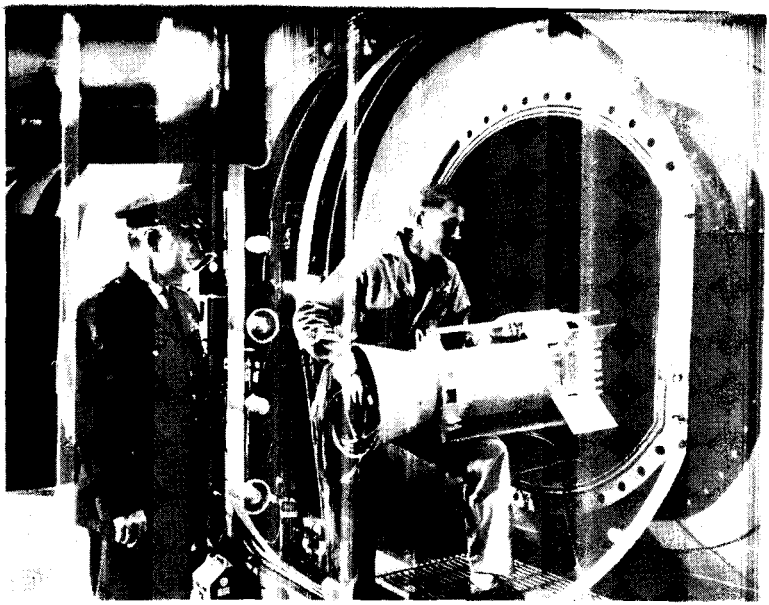
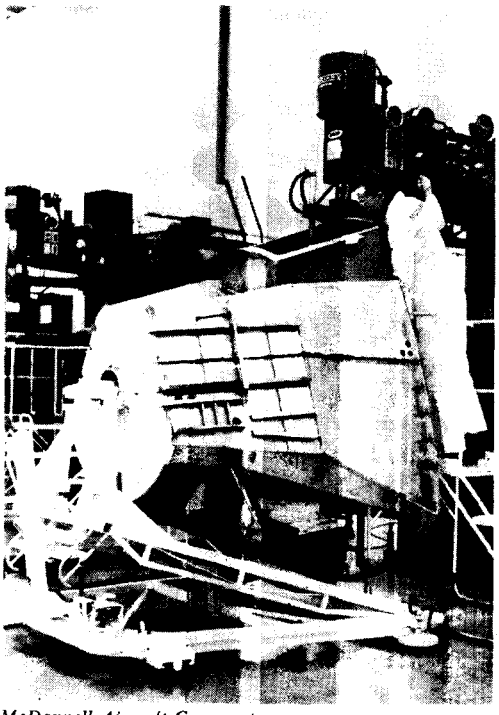


Technician installs full scale model of SNAP (System for Nuclear Auxiliary Power) vehicle in test section of 100 inch Tunnel F. Inset shows model during mach 20 test.



The all titanium pressure cabin gets prepared for a shot in the bottom. 'Tain't penicillin in that needle either.

McDonnell Aircraft Corporation

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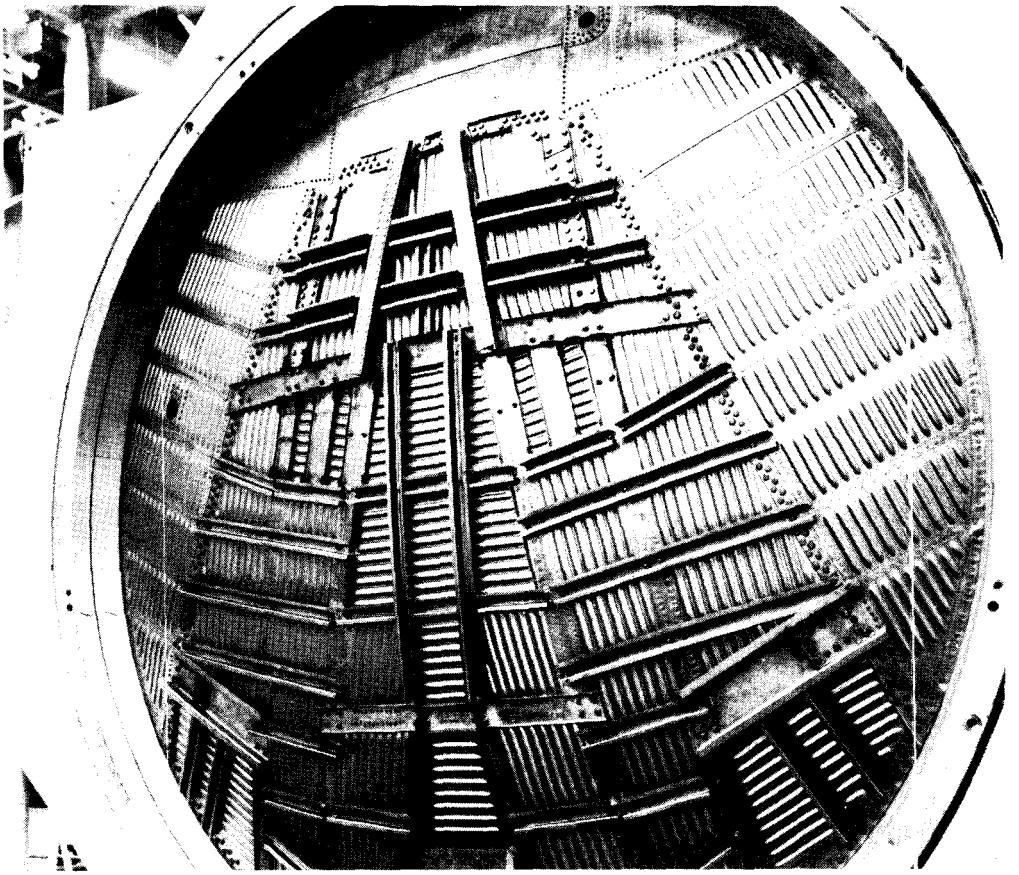

McDonnell Aircraft Corporation

Large pressure bulkhead, to which the heat shield is bonded.

above the earth, its density decreasing logrithmically. Near 300,000 feet—roughly fifty-five miles—it forms a barrier, between space and the denser earthbound air.*

As we have said, space is a medium; atmosphere is another; so are water and land masses. Those who've spent some part of their life swimming know of leaving the atmosphere and diving into water. A belly flop from a twenty-five-foot high dive is painful. More painful still, if the pool's empty. Fatal, if the diving board is replaced by the Empire State Building.

Imagine that the pool is dirt and that you can swim in it if your forward speed is slow enough. Imagine

*Some authorities place the beginnings of space at 400,000 feet, some twenty miles higher.

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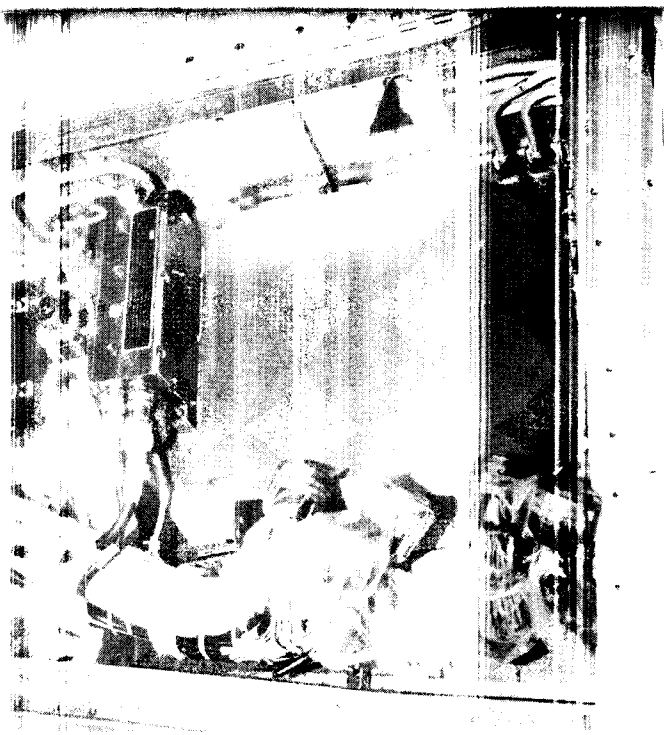

Cold plates, to which electronic packages are mounted, are used to transfer equipment heat into the cooling system.

Technicians prepare fiberglass honeycomb for bonding to the heat shield's basic sandwich.

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too, that this dirt-filled pool is covered with dust. You dive into the dust; it slows you down before you strike the solid soil beneath. The dust layer is analogous to our upper atmosphere barrier.

Any object with the speed of a spacecraft that strikes the air barrier is in for trouble. The atmosphere drags at the object. It slows down. Its kinetic energy transforms into heat.

But wait a minute! Isn't that just what we're looking for?

It's exactly what we're looking for—except for one thing. Because the atmosphere is so darned thick, so sluggish, the hypersonic body slows down *too* fast. So fast, that the expending kinetic energy tries to burn the object to a cinder. Only if the object is large enough will part of it survive the atmospheric reentry—meteorite-like.

Shooting stars have a purpose: Entertaining young lovers on a summer's night. No human wants to become one. This method looked like a poor approach to bring astronauts back home.

There was another possible approach. It had been used in early science-fiction movies. We could use a powerful rocket to slow the spaceship down. Pointing the nozzles earthward and backing down on our own fire tail. The only thing wrong with that method is that it was expensive and there wasn't a rocket big enough to put the combined weight of an ATLAS coupled to a GEMINI into orbit. (The SATURN V has enough thrust. But we were anxious to get into space and that rocket isn't due for launching until sometime this year. So why not think of a shortcut?)

In the 1950s we saw two, "possible in this decade," methods. We could build a space glider that would fly into the atmosphere, heat up and fly out again. Its kinetic energy would be expended over a greater period of time—like our baseball bouncing to a stop. Or, we could devise some way to make our space-capsule survive the meteorite-like plunge.

Both systems have been researched extensively. The former is probably the best and ultimate method. But it got hobbled up in politics and we adopted the latter approach.*

Spacecraft, like the automobile had to start somewhere—without past experience. NASA, newly formed and very wet behind the ears, had little to go on. McDonnell Aircraft, the Mercury contractor, hadn't much more background—they did have interest and foresight enough to look into several aspects of space flight. Was there anywhere they could borrow experience? It was at this point the infant space-vessel industry turned to the military for help.

The second most difficult prob-

*See "One MOL Step Forward," Analog August 1966

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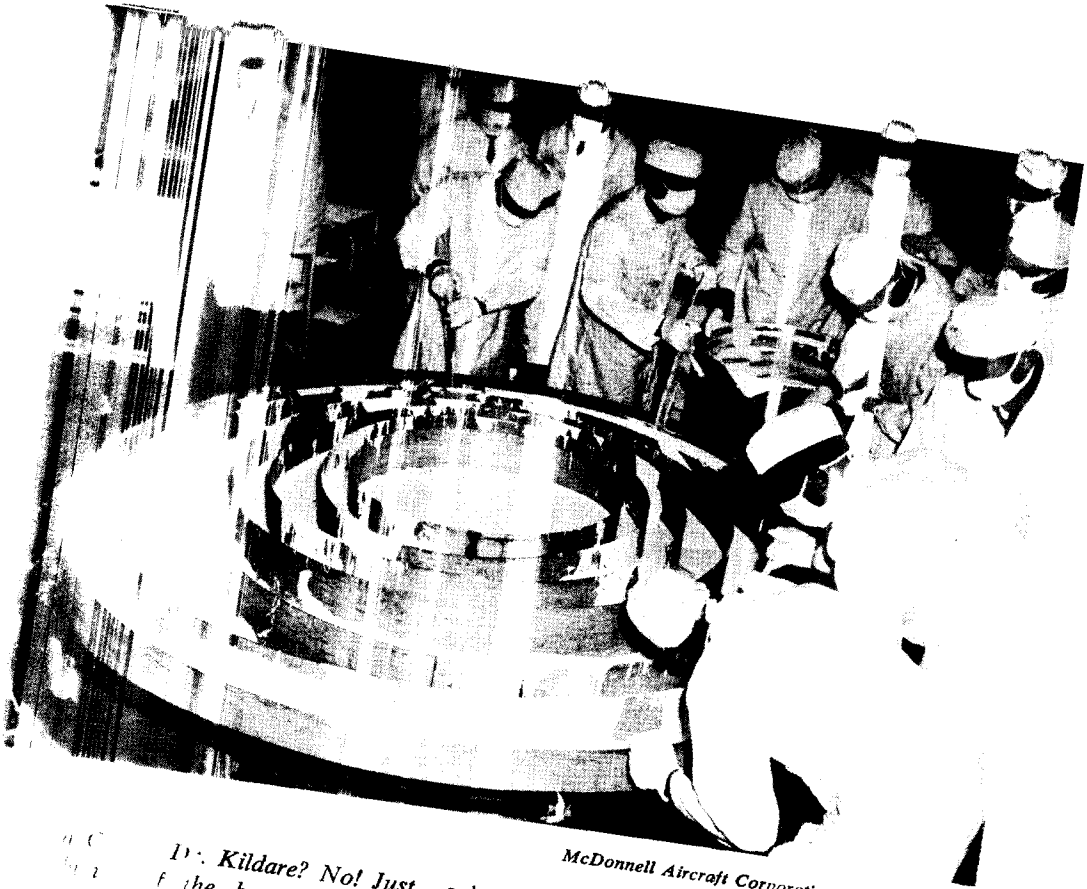

McDonnell Aircraft Corporation

Dr. Kildare? No! Just [illegible] the boys filling the [illegible] with DC-325.

[illegible] Ballistic Missile warfare was [illegible] a warhead that would sur- [illegible] journey. (The first most [illegible] being working the bugs out [illegible] booster system!) A ballistic [illegible] doesn't orbit. Not because [illegible] can't, but because it wasn't de- [illegible] to. (International law pro- [illegible] orbiting bombs.) A ballistic warhead is thrust out of the atmo- sphere, slows to a zenith point and then falls earthward—hopefully on target. When it reaches the atmo- sphere it suffers the same old prob- lem—how to expend its kinetic en- ergy without becoming a carbon speck in our polluted atmosphere.

Bring 'Em Back Alive

This is a problem for the aero- dynamicist. His laboratory is the wind tunnel.

Aircraft designers learned long ago that instead of building your mistakes and let a pilot try flying them away, it was cheaper in the long run and, incidentally, easier to get test pilots, if one could simu- late the flight by putting a model of your monstrosity into a controlled path of moving air.

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The first wind tunnels—aircraft propellers turned by electric motors—were installed in several University's schools of Aeronautical Engineering. Private industry bought time at these scholarly test cells. Eventually time became so darned hard to find—what with everybody designing airplanes—that many companies built their own wind tunnels.

Tunnel ownership has often led to a company's superiority in the aircraft industry. For example, many years ago hypersonic flight was downright impossible. The thrust was available. The designs had structural integrity. But when the speed exceeded mach 1, the wind seemed to get balled up and the drag factor went sky high.

It's industrial mythology how McDonnell Aircraft, in utter frustration, broke down this barrier in their own wind tunnel. They had an idea that the basic shape was faulty. They built a model whose structure could be easily deformed. After exhaustive studies in form variation, they'd reached absolutely *zero* results.

One disgusted engineer stepped into the tunnel and snapped a rubber band around the model's midrift. It pinched up a little bit—like a coke bottle—and they ran up the tunnel again. IT WORKED!

Like most stories this one might have grown in retelling. But the coke bottle effect broke down the doors to hypersonic aircraft and paved the expressway for McDonnell's superiority in fighter planes.

Space science is a dependent discipline, a space team is an amalgamation of talents. The science's total aspect depends on other people, other advances, other weak links in the chain that girdles the earth, securing it to the explorable universe.

In itself, wind tunnel development is a tale of heroism. A lifelong fight to conquer the elements by imitating them.

Initially it was simple. But by World War II—when aircraft exceeded 200 mph—problems entered the scene. Entered! Those problems *occupied* that scene. It took brute force to push wind beyond *hurricane* speeds.

They cascaded the compressor units; one motor building up the air speed and the second adding to it. This technique established a mighty head of wind—but did it gobble the kilowatts! The Boeing facility, in Seattle, Washington, put such a load on the power line that the power company directed Boeing to use their tunnel only between midnight and six in the morning!

The next question to be answered, in the following years, was: "How do you break the sound barrier?" It didn't seem possible to cascade enough compressors to push wind that fast.

So what do you do with a brick-wall type problem? You go back to the beginning. You ask yourself. "What is it you're trying to do?"

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And you answer yourself: "I'm trying to make wind move."

"What makes wind move?"

"A propeller."

"Think again, stupid."

You try again. You think. You take a look at nature. "Pressure differential," you scream. The white-jacketed men carry you away.

Within the padded cell's walls you're struck with the realization that you've just invented the *blowdown* tunnel. *If* you can convince the state that you always talk to yourself and that you're not gleeps.

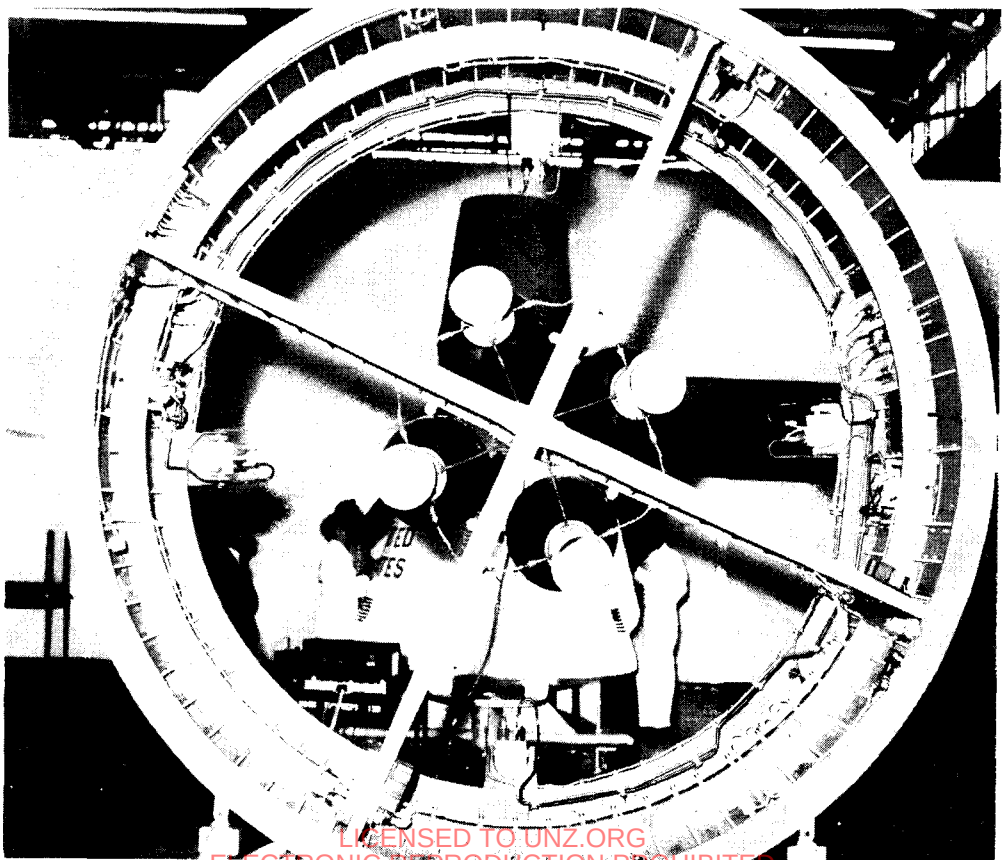
The *blowdown* tunnel uses two huge steel spheres. The tunnel's test section lies between them, connected with large pipes. A valve closes separating the upwind tank from the test section. The downwind tank and the test cell are evacuated—pumped down. Simultaneously air is pumped into the upwind sphere.

The valve opens—*WHOOSH*—the tanks equalize.

Air speed and test duration depend on specific pressure differentials and valve dimensions.

First, ya put on the retrograde section. . . .

McDonnell Aircraft Corporation



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The *blowdown* tunnel has some serious problems. At best, it delivers wind for one-twentieth of a second. Hardly imitating a space vehicle diving homeward. In that brief burst, no model is going to heat up to—*operating temp.*

So you think again. You're looking for mach 20 and 8,000°F. More severe than the Bible's most vivid description of Hell.

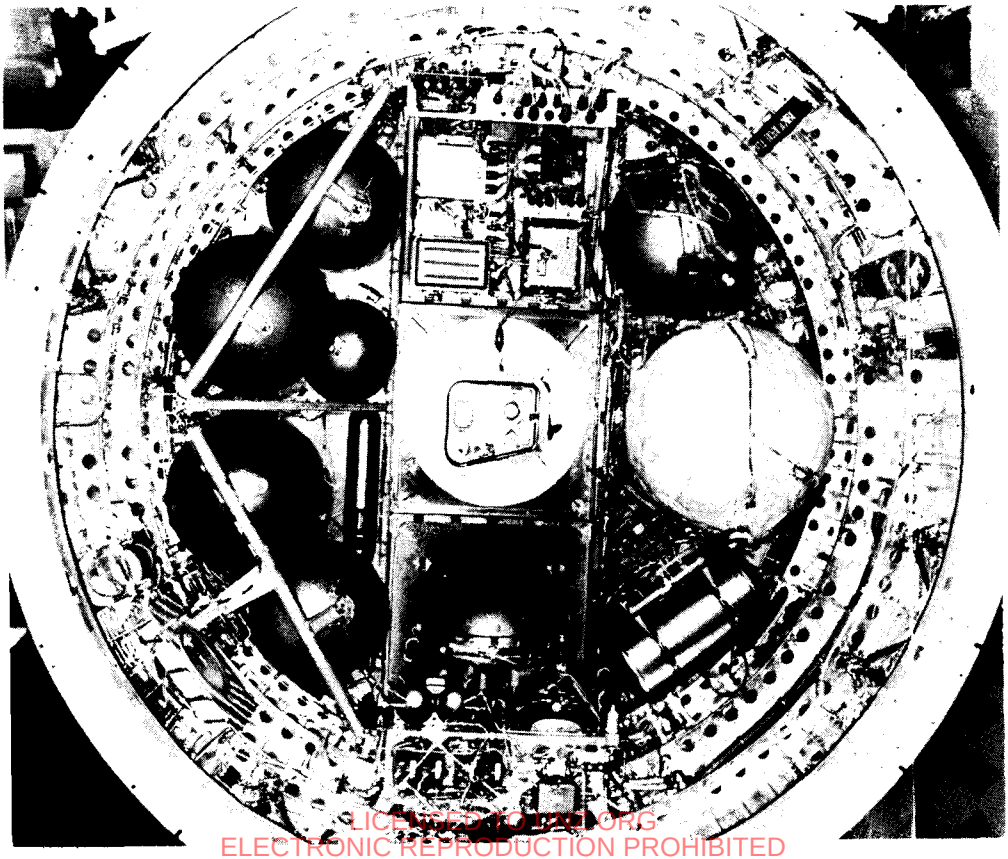
An approach to this, by ARO Inc., a division of Sverdrup and Parcel Inc., is the *hotshot* tunnel, based on the *blowdown* concept.

The components of the *hotshot* system are a generator, an electrical energy storage unit, an arc chamber, a nozzle, a test section and the vacuum tank.

The arc chamber is separated from the test section and vacuum tank by a calibrated burst diaphragm. The arc chamber is filled with gas—air, or nitrogen—and the test section and vacuum tank are pumped down. The electrical storage unit is charged.

Then cover it with the equipment section. Caution! Remove in reverse order before re-entry.

McDonnell Aircraft Corporation



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The storage unit is discharged into the arc chamber. A flash of brilliant light. The chamber pressure and temperature build up—to a maximum of 8,000°F and 20,000 pounds per square inch—until the calibrated diaphragm bursts.

One of the nation's most complete wind-tunnel laboratories is the von Karman Gas Dynamics Facilities at Arnold Engineering Development Center, Arnold Air Force Station, Tennessee.*

Operated by ARO Inc., this facility provides speed from mach 1.05 to over 20, in eight separate tunnels. Three tunnels are of the continuous-flow type. Air is supplied to these from an eight-mile-long, nine-stage compressor unit, driven by electric motors with a combined horsepower of 100,000 galloping ponies.

At the von Karman unit, they use a new twist to put continuous flow tunnels into the hypersonic realm, flexible nozzles—venturis—which can change the airspeed from mach 1.5 to 6 while the tunnel, of course, is in operation.

An interesting point—venturis have been around a long time. The carburetor on your automobile is a venturi. And, it's been known that air speed increases within the venturi's throat. Yet, we developed the *blowdown* because we couldn't see this application.

The second tunnel has a fixed nozzle which produces a constant mach 8 and the third is fixed at mach 10.

The von Karman facility uses two *blowdown* units, one from mach 1.5 to 5 and the second from mach 5 to 8. Their hotshot tunnel operates from 10 to 20 mach.

Even these tunnels fail to adequately duplicate re-entry environments. Coupled together, they all tend to point out approaches, to give insight and, after exhaustive eliminations, to give us some shapes and material that we're able to use.

But these are all high pressure, hypervelocity units. Indeed, the velocity is established by high pressure. Up there at 200K and 300K feet the air is mighty thin. To study this area accurately we need a *low* density tunnel.

Present approaches at the von Karman facility uses plasma torches, which heat any variety of gases to the order of 4,000 to 10,000°F. Equivalent densities have been established up to fifty miles—264,000 feet. At these simulated environments GEMINI models glow cherry red at mach 10!

The aerodynamicist's job has some built-in handicaps. He isn't always allowed to use any shape he wishes. A re-entry vehicle's shape is largely dictated by its function. A bomb is *so* big and to work it's designed into a specifically shaped package. This shape must be enclosed in the nose cone. To maintain range, weight must be kept to a min-

*Named after General HH. (Hap) Arnold. World War II Army Air Force Commander.

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imum. There's no place here for Detroit inspired free forms.

A spaceship's size and shape is dictated, too. It must mount to a rocket of specific shape, and house men.

Materials had to be found that could survive the kinetic energy release and we were restricted to using only minor shape variations. Common sense was applied again. Nature provided us—in the meteorite—good examples of *poor* material. So armed with this slight musket of information, we went hunting for material—be it caramel candy or goose feathers—that would survive the ordeal.

AVCO was one of the first companies to prove a material. They came out with a patented ceramic coating that heated up and then fell off in the slipstream. Ablation, they called the phenomenon. After it burned off it left another layer beneath—new material to heat.

The next problem was determining how much of this ablative compound to put on and where. Well—back to the wind tunnel!

The manned spacecraft presented a slightly different problem. To maneuver in space we needed thrusters—open ports. To transmit data and voice communications we needed antenna nacelles. To put in a man we needed a hatchway. We couldn't put it together and then dunk it into a ceramic bath. And, because the pilot would survive better coming in back side first, why not build a heat shield on the blunt end?

McDonnell Aircraft, using their own wind tunnel, devised an ablative gooey substance—it hardened after application—heat-shield shape and construction approach for MERCURY. GEMINI uses the same material and process, but a larger shield.

On GEMINI McDonnell begins with a load-carrying fibre-glass sandwich. Two five-ply resin impregnated slices are buttered together with a 0.65 inch core. An additional honeycomb, with nearly a quarter million cells, is bonded to the sandwich's convex side. The ablative agent, marketed by Dow Corning under the alpha-numeric trade name DC 325, is squeezed into the honeycomb.

The entire shield is encircled with a fiberite ring.

Now, another brain teaser enters. How do you know that you've built a good heat shield? It can't be cut in two. Do you ask the astronauts to bring the shield back if it fails?

The answer is nondestructive testing. At McDonnell they X ray to document lack of bond, inclusions or voids. (Potential hot seats.) A 0.20 inch mylar cover containing horizontal and vertical index lines is used to superimpose an identity field on the X ray. Defects are zeroed in by laying a Polaroid film pack on the suspect area and re-shooting the picture. Defective cells are then

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marked with a map pin and sent back for rework.

But there're more problems to designing a spacecraft—more problems to puzzle that particular person who chooses a lifetime's work in spacecraft design.

GEMINI had some *peculiar* problems. It was to act as a trainer, an interim step. MERCURY proved that man could live in a confined imitation atmosphere while transversing the heavens. GEMINI had to prove that man could do *more* than just live. It had to prove that trained people could work, could repair breakdowns and—in an emergency—exit into the void when he needed to be, *out there.*

And, because the APOLLO moon launch involved a tricky, turn-yourself-around-and-mate-with-the-LEM-maneuver, we needed people proficient in docking their spacecraft with other objects.

A big order from the beginning. No room here for Model T simplicity. And the problems grew even more complicated!

Until SATURN V, which has the power to fling everything NASA's ever caused to exit into space with a single blast, we've fought a nagging weight problem.

If space probes weigh too much —more than the booster's thrust— they go nowhere. Space designers are so critical of poundage that they even pare the amount of solder used to make joints on the printed circuit boards.

But there're more extremes than this! Space probes often use magnets. They're the heart of a great number of long-named instruments.

But do these space probes use steel magnets? No indeed, they don't even use Alnico. Platinum-cobalt.

In comparison to platinum, gold is a poor man's metal. Yet in space, platinum-cobalt magnets are cheap. They provide so much more magnet per pound that they save a veritable *fortune* in lift-off weight.

Structural materials had to be found that were more than light—they had to be tough.

The GEMINI missions would last for weeks. They needed to pack food, water and electrical power for the trip. In order to practice docking they needed propulsion units with which to maneuver. Designers knew already that they were too heavy to carry their own target for docking practice. The target would have to be launched separately. To find that target the GEMINI would need radar to point the way.

When the needs were laid out it looked like a blivot.*

Luckily, much of the necessary-but-where-do-you-put-it equipment could be housed outside the spacecraft. They could attach it inside the shroud work which held the GEMINI to the TITAN II.

Talk of a weight-saving blessing. The shroud work didn't have to re-

*Blivot: Ten pounds of dirt in a seven-pound container.

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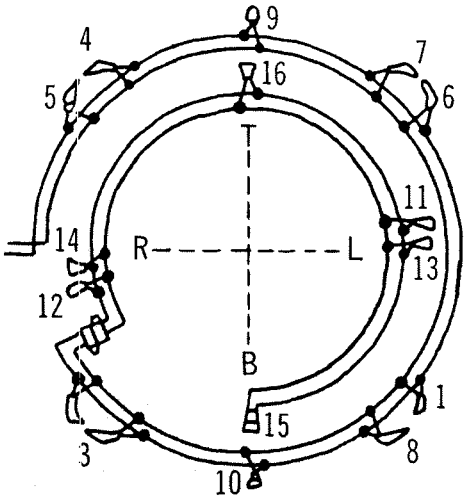

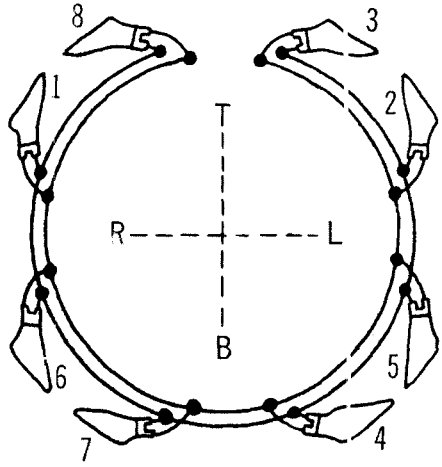

Illustration 1: OAMS ring, as viewed from the small end.
Illustration 2: RCS thrust ring. Two rings are provided. Ring A is forward. View is from the small end.

turn. It could be made of material that was not only light—but in relation to the space cabin—flimsy.

Choosing material for specific uses is an arduous routine. Naturally, because of our obesity problem we wanted a light structural material. Iron at a density of 7.8 was too heavy. Aluminum at 2.8 was nice and light. Aluminum! At re-entry temperatures aluminum would vaporize. Well then—titanium?

The fabrication men turned green, followed by splotches of purple. Titanium was as tough as stainless, it would take 1400°C without blushing. But carbide machine tools wouldn't touch Ti. Welders hot enough to melt it also could set it on fire. And when Ti once starts to burn —forget it, buster!

But the fab people lost out.

The spacecraft was divided into several sections—fore and aft; they were: R&R (Rendezvous and Recovery), RCS (Re-entry Control System), Cabin, Retrograde section and the Equipment section. The Retrograde and Equipment sections comprising the Adapter module.

The entire re-entry module was constructed from titanium bulkheads, rings and stringer. Eighty-five percent of the cabin section, including the equipment bay doors and hatches, was made of welded titanium assemblies. It was here that most of the titanium handling problems occurred.

At McDonnell, they use weld chambers to tackle Ti's obstinacy. The welding jig and material are

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placed inside the chamber and the air is replaced with inert Argon gas. The welder watches his work through a porthole and handles his torch via chamber-mounted pressurized rubber gloves.

Automatic chambers are used for butt welds, angle welds, corner welds or T welds.

The spacecraft's pressurized cabin walls consist of two 0.010 inch titanium sheets welded together. The large pressure bulkhead, against which the astronauts' seats lie, are of the same material but with a spherical contour. Its outside wall, to which the head shield is bonded, is re-inforced with strengthening beads.

The adapter section—remember we throw it away before we re-enter —is constructed from aluminum rings, extruded magnesium alloy stringers and a magnesium skin. The T shaped stringers are hollow and act as a radiator for the environmental control system.

The cabin is sheathed in Rene' 41 "shingles." The R&R section and the RCS section use berylium "shingles."

The adapter section skins are fabricated in two different sized quarter panels. On final assembly, the radiator extrusions are joined by using filler wire and a small hand torch, making a fillet weld at each sleeve joined end. Since the radiator extrusion is already seam-welded to the adapter skin, the welder must use a mirror to see his weld.

All adapter section welds are magnafluxed and X ray inspected. The radiator tubing is pressure checked to assure "no leaks."

Another problem facing the hapless designer was how to move the spaceship in space. How to orient the spacecraft in relation to the target. Unlike an earthbound automobile, the orbiting space vessel would be free to move in all directions.

How many of them would be of value? What type of system could be used to provide this motion?

This problem enthusiasts have pondered for years. One solution for positioning would be that of a rotating flywheel. An electric motor, driving a wheel to the right would —by conservation of angular momentum—cause the ship to rotate left. Braking the flywheel would, correspondingly, brake the spaceship. Three such flywheels would give the ship complete control in three axes.

Project MERCURY didn't seriously consider that system. Instead, they used a tank of hydrogen peroxide which was valved through jet ports into space. By the time GEMINI was laid to paper, the flywheel approach was all but forgotten. Perhaps to be revived by a lost astronaut some day when his fuel-powered maneuvering system runs dry.

GEMINI uses three separate propulsion systems, OAMS (Orbit Attitude and Maneuvering System), RCS (Re-entry Control System)

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and RRS (Retrograde Rocket System.) They give sufficient thruster capabilities to maneuver in all directions, decelerate for re-entry and control the re-entry attitude.

The sixteen OAMS thrust chambers are mounted in the adapter section, each in a fixed position and operated at fixed-thrust levels. The astronaut controls the timer period the chambers are "on." The only difference between GEMINI and APOLLO will be that the APOLLO system will be integral with the spaceship.

Getting fuel to flow in space is a challenge. You can't rely on gravity and pumps aren't always foolproof. Particularly with such corrosive propellants as nitrogen tetroxide and monomethylhydrazene. Four propellant tanks are housed in the

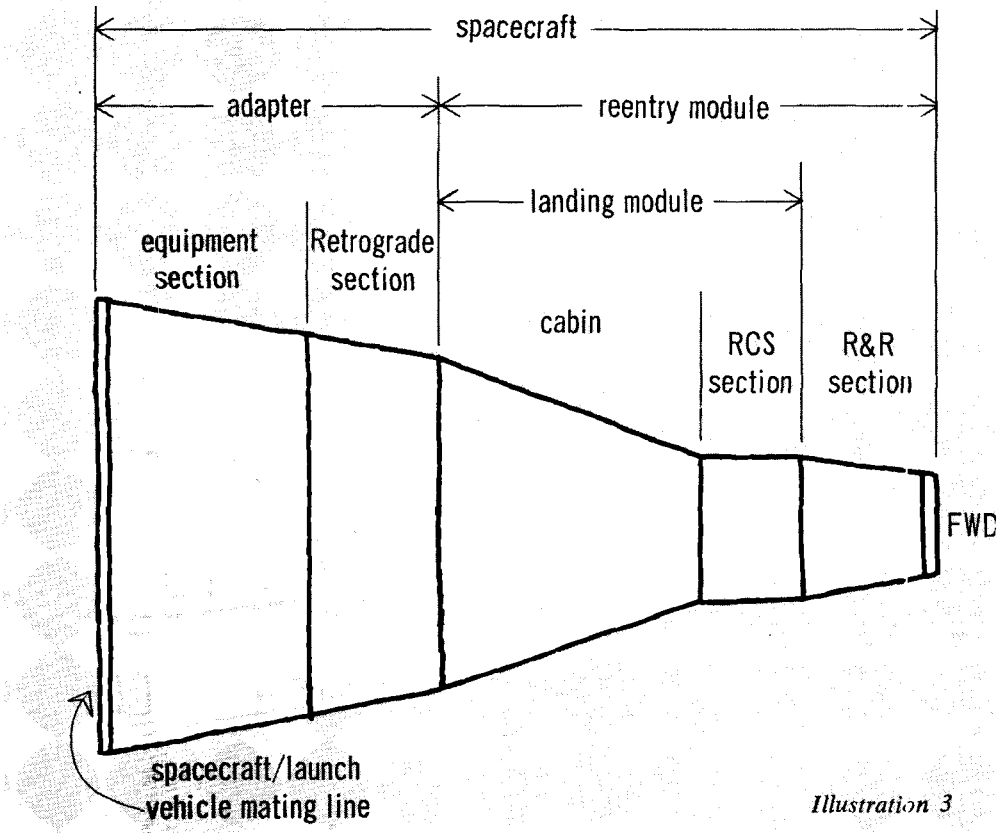

Illustration 3

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adapter section, two for each chemical.

Within each tank is a bladder. The fuel and oxidizer are, in reality, placed within the bladder's confines. Another set of tanks, containing pressurized helium, are connected to the propellant tanks through a distribution system. The helium, valved to enter the propellant tanks *between* the bladder and the tank walls, squeeze the propellants into the OAMS rings.

The OAMS thrusters give the astronauts complete control while in space.

"Who ya kiddin'" you're probably saying right now. "What happened to GEMINI VIII?"

See illustration 1. The inner section of the ring is located amidships of the CG. Firing thruster 15 will push the entire spaceship up, 16 for down, 13 for right and 14 for left. Thrusters 11 and 12 are for backing. The outer ring sits behind the CG at the Adapter module's rear end.

Firing pairs of these thrusters will make the spacecraft twist, roll or tumble at the command of the pilot. Firing 3 and 4 will move the ship's stern to the astronaut's left and the nose to the right. If the thruster jams open, the ship will spin!

Which is what happened to spacecraft VIII. The oxidizer valve jammed. The ship momentarily resorted to the MERCURY control system—gas vented into space. This produced rotation in the longitudinal axis and spin in the yaw plane. If the command pilot had known which thruster was stuck, he could have fired another set to counterbalance the jammed valve.

But the command pilot, Armstrong, was in a jam. The Agena, to which he was docked, had a similar set of thrusters. He didn't know which was firing, his or the Agena's. He triggered posts 11 and 12 and backed away. The total mass decreased and the ship started whipping around and around, rolling and spinning. Eventually the oxidizer tanks ran dry. But the ship, still following the laws of physics, kept spinning.

Which seems to prove that space is going to be a much more forgiving medium than land, sea or air. That kind of trouble in an earthbound sphere would really be disastrous.

We've spent many hours in astronaut training, building an extrahuman capacity quick thinking and what-kind-of-a-jam-are-you-in analysis. But how was Armstrong to think his way out of this one?

The RCS section contains another set of thrusters. It's an entirely separate system but works on the same principle. (See illustration 2) Armstrong used them to regain control. He then faced the decision of continuing the mission with the OAMS system gone and using up fuel reserved for re-entry control.

Because the RCS system lacks thrusters for translation, further attempts at docking were useless. Even if the "book" didn't say to

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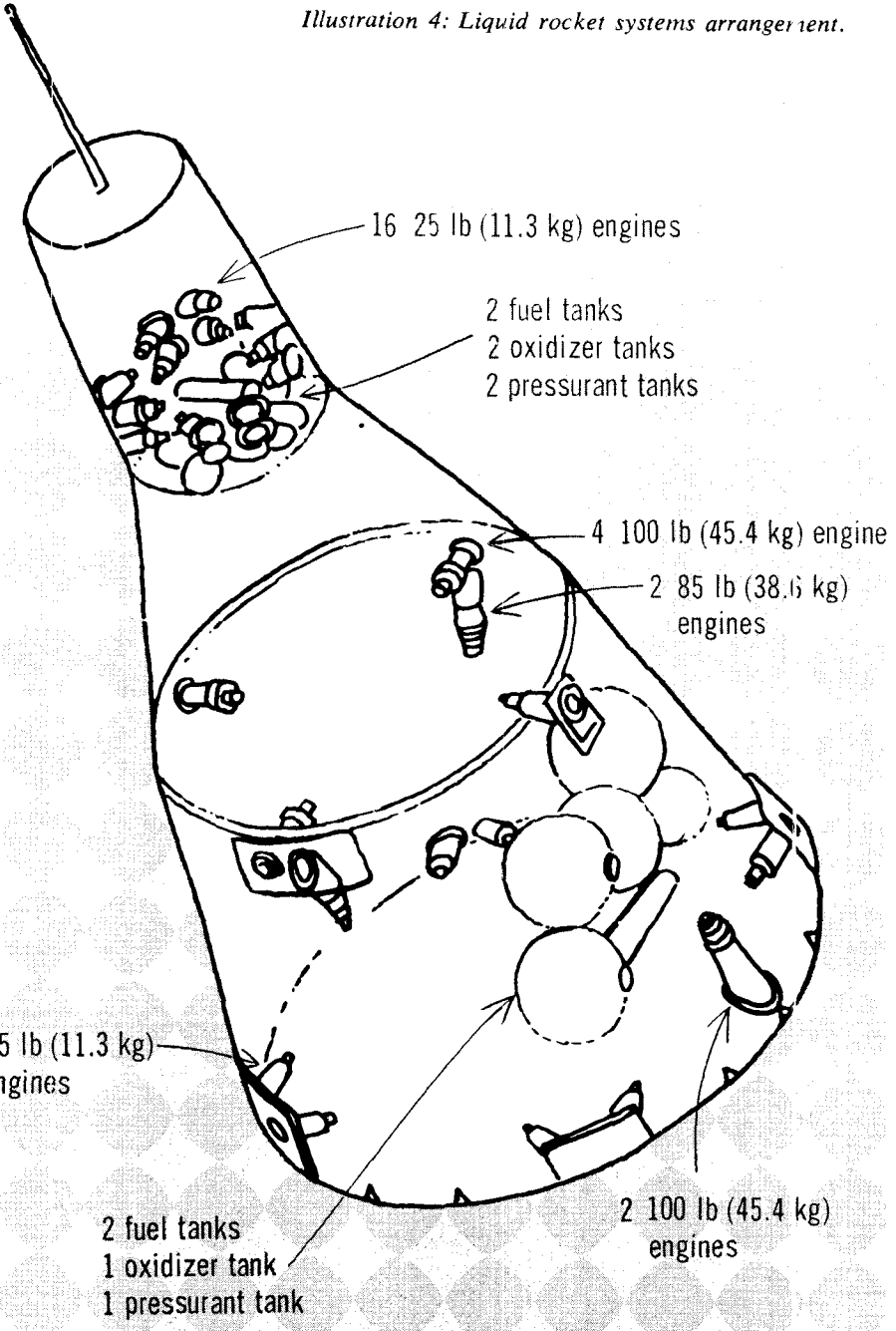
Illustration 4: Liquid rocket systems arrangement.


16 25 lb (11.3 kg) engines
2 fuel tanks
2 oxidizer tanks
2 pressurant tanks
4 100 lb (45.4 kg) engine
2 85 lb (38.6 kg) engines
8 25 lb (11.3 kg) engines
2 fuel tanks
1 oxidizer tank
1 pressurant tank
2 100 lb (45.4 kg) engines

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come back, they were just as well off to do so because they couldn't do any more docking maneuvers.

Which brings us to the details of getting our astronauts back from space.

During normal re-entry the OAMS system orients the spacecraft to the retrograde position and then the equipment section, and all the equipment in it, is blown away. (GEMINI VIII had to use the RCS section for this.) At TR (Time to Retrofire) the, now exposed, four solid fueled 2,500 pound thrust retrograde rockets fire.

At TR plus forty-five seconds, the retrograde section is jettisoned, leaving the spacecraft with its heat shield facing forward in a ballistic fall path.

Fourteen minutes past TR the spaceship is at 400,000 feet —about seventy-five miles. It's falling earthward, still describing a shallow elliptical curve. It enters the uppermost realm of the atmosphere. At first there's negligible friction. The friction increases until two minutes later the spacecraft is emersed in the ablative flame spewing from the heat shield—8,000°K at the heat-shield center. To the side a furnace-like wind swirls and surrounds the ship. Behind the ship, a fiery wake drifts upward. The ablative particles form again, to a molten 5,000°K fireball. The atmosphere ionizes. Telemetry and voice communication is blacked out. The ion sheath is impenetrable by radio-frequency waves.

Four minutes of burn in. The command pilot firing the RCS thrusters, controlling the angle of entry, tries to land as near the recovery point as possible, knowing that a goof would turn him upside down—an automatic cinder maker! And then—the fire dies away.

They're in free fall, still describing part of that ellipse, bottom side down. It's twenty minutes after retrofire. Thirty-seven seconds later something peculiar happens. Something like crossing the International Date Line or the Equator. The altimeter comes off the peg! Where it's been stuck since lift off!

A minute later at 50,000 feet, mortar charges fire the *High Altitude Drogue Parachute*. At 10,600 feet the flight crew deploys the pilot chute. Two and a half seconds later the R&R section separates automatically from the RCS section and pulls the main parachute out.

They land heads up in the water. The journey is over, but the ordeal is just beginning. The astronauts wait to be found by the helicopter search crew. While they wait, the spacecraft, designed to leave the atmosphere and return, is sitting in a third medium, the sea. It bobs, rocks and turns. The astronauts' stomachs start twitching and rolling, too.

Astronaut Frank Borman described it, "That GEMINI is one swell spaceship, but—it's a hell of a boat!" ■

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Amazon Planet

Part II of III.

That Amazonia was governed in a very odd manner was known throughout United Planets—but the facts were quite considerably more unusual than "everybody knew"!

MACK REYNOLDS

Illustrated by Kelly Freas

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SYNOPSIS

GUY THOMAS, a quiet, inoffensive representative of United Planets' Department of Interplanetary Trade, boards the spaceship Schirra *en route from Earth to Amazonia to expedite an exchange of iridium and columbium with Avalon.*

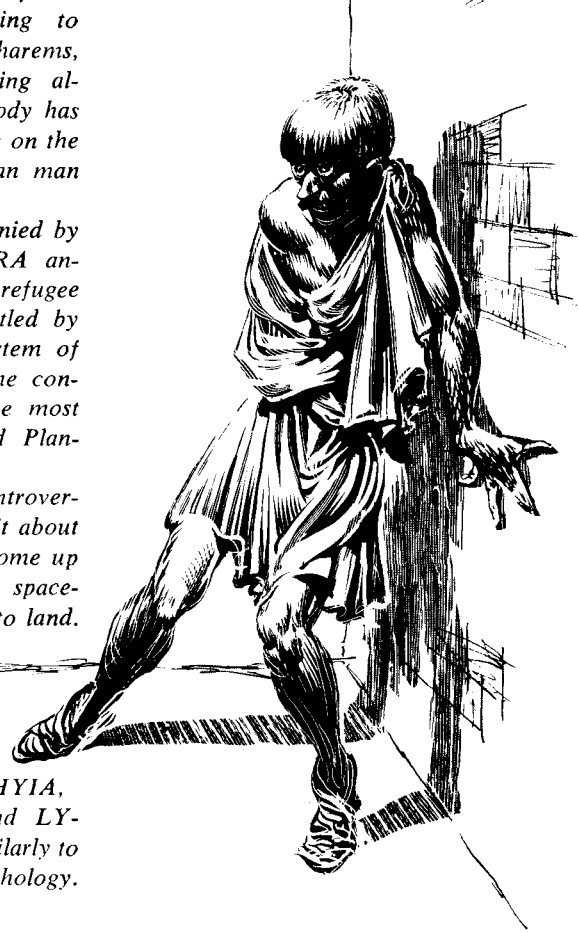
Ship's officers, including REX RAVELLE, are astonished at his destination and warn him of the matriarchy there. According to them, men are kept in harems, each Amazon warrior being allowed three husbands. Nobody has ever heard of a man landing on the planet nor of an Amazonian man escaping.

Their stories are hotly denied by PATRICIA "PAT" O'GARA another passenger who is a refugee from Victoria, a world settled by advocates of the social system of the Nineteenth Century. She contends that Amazonia is the most advanced planet in United Planets.

When they reach the controversial world, they go into orbit about it and wait for lighters to come up and take off the cargo. No spaceship crewed by men, dares to land.

Four Amazonian customs officials come aboard including MAJOR OREITHYIA, MINYTHYIA, CLETE and LYSIPPE. They are dressed similarly to warriors out of Greek mythology. Clete quickly puts Rex Ravelle in his place with a demonstration of knife throwing.

They are surprised that Pat O'Gara has no visa to land but are sympathetic to the fact that she is a refugee from a man-dominated world. But they are even more shocked when they find Guy Thomas is a man. The record they have of his visa is for Gay Thomas, and they expected him to be a woman.



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They let him know that, if he lands on Amazonia, he is subject to local marriage laws and can be taken by any warrior who has less than three men. Minythyia, who informs him she has no husbands at all, lets him know that she's in the market, and wants to know if he can kiss the way they do on the Tri-Di show tapes they occasionally get from Earth.

The need for columbium is such that arrangements are made for Guy to land under the guard of the major, Clete and Lysippe. They take him to a bachelor sanctuary where he meets PODNER BATES an effeminate seeming Amazonian male.

Left in his room that night, the quiet Guy Thomas metamorphoses. He takes several supposed tools from his kit, puts them together in such wise as to make a gun, opens his window and climbs down the side of the wall.

Evidently knowing the layout of the city, he walks along through the night toward some mysterious destination. Suddenly, a gun flares before him, the beam nearly cutting him down. He falls to the sidewalk, his own weapon in hand.

"This wasn't in the script!" he mutters, thumbing off the safety stud of his own gun.

Part 2
V

Happily, Guy Thomas was in a shadowy area, even darker than the balance of the alley street. It had been pure luck, when he rolled away from the other's line of fire, that had put him there. He doubted, unless his attacker was using infrared, that the other could make out his position. Guy took his time, studying the layout.

He decided that a stone doorway, possibly thirty feet up the passage, must be the other's ambush. The light which had accompanied the beam, must have come from approximately there. Guy brought his left hand up and made his grip on the gun a double one, for greater stability. He tightened trigger pressure slowly, not quite squeezing off.

As he stared at the doorway his eyes slowly became more accustomed to the shadows. And, yes, unless vision played him false, he could see the barest suggestion of a figure there—not enough of a target to expect a hit. He continued to hold his fire.

His opponent moved slightly. It came to Guy that his foe couldn't be sure if he had hit his victim or not. The beam had lashed out, Guy had fallen to the street; since then, he had made no motion. Certainly the other was playing it cautious.

He saw the figure move again, revealing a bit more of itself. Unless he was mistaken, that was a head, half exposed, trying to seek out Guy's position.

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There was no doubt in Guy's mind whatsoever. The attack had been an attempt at murder. Not just a mugging, not just an attempt at robbery. The other was after life. Was it a case of mistaken identity? There would seem to be no other alternative that made sense. But mistaken identity or not, the assassin was interested in murder and nothing short of that. Guy Thomas's lips were already dry, now they thinned back over his teeth inadvertently.

The figure moved again. A full half of a human form was revealed. Guy tightened his grip on the trigger, ever so slightly. The silenced, recoilless handweapon coughed.

There was a scream from up the alley, high-pitched at first then trailing off in an attempt at repression. A figure staggered from the doorway, brought itself up sharp, then scurried away in the direction of greater dark. Something clattered to the pavement.

For a brief moment, Guy, now on one knee, leveled the gun again. But then he shook his head and held fire. The other was winged. His death would avail the Earthling nothing, and might even possibly lead to complications.

Guy stood erect and walked toward the recess in which the assassin had stood in hiding. There on the ground was the gun the unknown had utilized. Guy picked it up and scowled at it, thrusting his own weapon into his belt again. He had never seen this type of gun, but he supposed there was no particular reason why he should have been expected to be acquainted with weapons that had evolved on this world. With three thousand planets in UP, even a full-time expert could hardly be knowledgeable about all the means evolved of dealing out death throughout the worlds.

He stuck the second weapon in his belt as well, and continued on his way.

He was nearing his destination now, and began checking the street names, inlaid attractively in mosaic at every crossing, in the pavement itself. He found his narrow street, found his number.

Guy Thomas hesitated before the stone arch and the door behind it. It was late, indeed. Perhaps he should have waited for another occasion. But he shrugged that off. What other occasion? For all he knew, there might not be any such. He had to take what opportunity offered.

He thumped on the door as gently as was consistent with arousing those within. He waited and then put his hand up again to thump once more.

But the door opened inward. He peered, to be confronted with darkness.

"Don't tread on me," he said softly, self-consciously.

"The Sons of Liberty Arise," a voice whispered back. "Come in."

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He moved forward. The door closed behind. And then there was light and a burly figure staring at him.

"Who in Zen are you?" the other rasped.

"I'm from Earth," Guy said.

"Sarpedon got through!"

"Yes."

"Good, good. Where is he? Still on Earth?"

"He's probably dead."

The other stared anew at the newcomer. "Dead?" he said blankly.

Guy said, "He disappeared. It's impossible to disappear on Earth—or all but impossible. Under the circumstances, we assumed he was dead."

The big man groaned, "Who did it?"

"We have no evidence who was responsible."

"I don't need evidence. Here, come on in. Follow me."

Guy followed him down a stone corridor, along the edge of a patio garden in the middle of which a small fountain tinkled. These houses were well done. He looked sharply left and right, as he went. Across the patio, two men were talking, their voices low; on their hips they carried quickdraw holsters. They passed a room, door open; five men sat around a table, playing cards. Guy noted two rifles leaning against the wall.

He followed the other into another room which was comparatively nude of furniture in spite of its size. A large table dominated its center and there were possibly a score of straight chairs, some about the table, some against the walls. The table was piled with a confusion of papers, pamphlets and books. And there was another man seated at it.

The one who had given Guy entrance said, "I'm Zeke. We don't use second names in our outfit. This is Teucer."

"My name's Thomas. Guy Thomas."

Teucer was a slight, strained man, a hungry look about him. His voice was just this side of being shrill. He said, "Don't tread on me."

Guy Thomas said to them both. "Don't misunderstand my position. I'm here to investigate. I don't necessarily back the stand you Sons of Liberty people are taking. I'm here to gather information."

"You're a *man,* aren't you?" Zeke said belligerently.

Guy eyed him.

Zeke said sourly, "Sit down. Did they only send one? We were hoping for a full landing of Space Marines."

Guy took the proffered chair. "Don't be ridiculous."

"It doesn't sound ridiculous to us," Teucer said. "Maybe it wouldn't be ridiculous to you, if you were a third-rate citizen on a world run by half-crazy mopsies."

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Zeke said, "Let me tell this, Teucer. We haven't got much time now. It'll be dawn, before too long and Zen knows when we can get together with Damon and the others and have a real meeting."

"Who's Damon?" Guy said.

"The headman in the Sons of Liberty."

"All right, obviously I'll have to see him sooner or later. Before we go any further; somebody took a shot at me on my way over here. I think I winged him."

Both Zeke and Teucer gawked at him. Though both wore the evidently universal tunic which came down, kiltlike, to approximately the knees, in every other respect they could hardly have been much different. Zeke was a dark man, gruff and unhappy. Teucer was overly thin, pale of face, quick in nervous movement. They wouldn't have impressed anyone as being a team.

Guy waited for their comment.

Zeke came to his feet, his face unbelieving, crossed to a niche set into the stone wall and brought forth a flask and three glasses. He brought the things back and set them on the table. He poured three drinks.

"Wine," he said. He took his up. "Who could it have been?"

"I haven't the slightest idea," Guy said reasonably. "A footpad? A common stickup man? But the thing is, he tried to kill me, not just roll me for my money."

Teucer was shaking his head. "I've read about how things are on Earth, but there are no, what you'd call, stickup men here in Themiscyra. For all practical purposes, there's no crime. It's all one big crime, maybe, but . . ."

Zeke cut in. "The thing is," he told Guy, "that there's no money —not like you know it. So it's not much use being a footpad, or whatever it was you called him. All he could get from crisping you would be your watch, your ring. It's not worth it."

Guy didn't like this. It added a factor that simply shouldn't have been here. It worried him. He said, "How many knew I was coming?"

Zeke scowled at him. "How do you mean? Nobody knew you were coming. How could we know you were coming? Sarpedon had no way of getting a message back to us."

Guy said. "Look, let's start at the beginning. Tell me, briefly, your position. I say briefly, because, of course, I heard your Sarpedon's story." He took up his glass and took a swallow. The wine was excellent, clean and fruity and similar to a Soave from that area of Earth once known as Italy.

Zeke took a deep draught of his own wine, wiped his mouth with the back of a beefy paw and said, "All right. Here we go. It's got to the point on Amazonia where we can't stand it any longer, under-

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stand? Men I mean. You get to the point finally where you can't stand it any longer, right?"

Guy said, "Go on."

"All right. A guy here, a guy there, began talking, began studying up on history, especially the history of revolts, revolutions, armed rebellions. The mopsies can't hide it all. If they want to be educated themselves, they've got to run the chance of us getting educated, too. It's too hard to hide books and reading tapes. Anyway, it started with a single man here and there and began to grow. The message began to spread. Then, suddenly, almost overnight, we found ourselves with an organization, an underground, the Sons of Liberty. It spread. It spread all over, not only in Paphlagonia but Lybia. The men over there are as fed up as we are here."

"And how's the movement going?" Guy said carefully.

"It's all set to blow. There's only one thing. Precious few men ever get the chance to work out with weapons, guns, explosives, that sort of thing."

Guy Thomas thought of Podner Bates and nodded understanding.

"The moment our underground stuck its head up, it'd be a bloodbath. Well, I guess that part of it's already obvious to you. At any rate, we decided to send a representative to United Planets. It wasn't easy. It's practically impossible for a man to leave Amazonia."

"So I understand," Guy nodded, sipping at the wine again.

Teucer filled all three of the glasses again. He began to say something, but Zeke held up a hand.

"Sarpedon was one of our best. He was, well, one of the top male athletes in Paphlagonia—they let us participate in some sports.' He grunted disgust. "At any rate, he was tops. He and Damon were kind of like brothers. I knew him myself. He was our best." He paused momentarily.

"Go ahead," Guy said.

"Well, the way we did it, we smuggled him out to the artificial satellite where the United Planets embassy is. We plotted it thoroughly, taking lots of time, and we finally made it. Hippolyte's gang never found out."

"You're lucky," Guy said evenly, "the embassy didn't turn him back to the authorities."

"Why should they? That satellite embassy is United Planets territory. He demanded political refuge."

"It's not ordinarily the sort of thing you can claim from UP," Guy said. "Amazonia is a member planet herself. It's not as though Sarpedon was claiming political refuge from Avalon or some other sovereign world. But go on."

Zeke snorted. "Most of the personnel on that satellite are *men*. They have an idea of what we go through down here. At any rate,

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they took Sarpedon in, gave him a great welcome, didn't let old Hippolyte's government hear a word about it. At the first chance they sent him back to Earth to have his say with the United Planets Assembly. Well, from what you report, he made it. The only thing surprises me, is your being here all alone. Where're the rest?"

Guy Thomas was shaking his head. "He didn't make his destination. The United Planets Assembly, which, of course, is composed of delegates from every member planet, never heard his plaint."

Teucer, indignant, shrilled, "How come?"

Guy looked at him. "Sarpedon appeared at the Octagon in Greater Washington. He was turned over to the Interplanetary Department of Justice which listened to his story and decided against letting him speak before the Assembly. He gave us your passwords, and where we could make contact with you. He turned over charts and city plans of Themiscyra. Of course, when I was given this assignment, I memorized them. We located him in an apartment, with the intention of keeping him in Greater Washington until we could look further into his complaint. Frankly, he was a hot potato. A few days later, he disappeared, leaving most of his effects, even personal ones, in the apartment. Needless to say, we suspected the worst. There is no possible way to exist on Earth as it is today, without such things as credit cards. Even the credit card we had issued him had been left behind."

"What I don't get," Zeke said lowly, "is the Octagon and this Department of Interplanetary Justice getting in the way of his speaking his piece in front of the Assembly. That would've given us a chance."

Guy looked at him in silence for a long moment, his mouth pursed in perplexity, as though wondering how to phrase what he had next to say.

Finally, "Zeke, Teucer, don't read more into the United Planets than is there. It's a very loosely knit organization and practically powerless. It isn't and was never meant to be a super-government. If it attempted to be, the member planets would drop away until for all practical purposes Earth would stand alone as a member."

They were frowning unhappily at his words, unhappily and half unbelievingly.

He shook his head. "In actuality, most planets join the organization to be assured of *not* being interfered with. They want protection against their neighboring worlds which have possibly different political, socioeconomic or religious institutions than their own. Aren't you familiar with Articles One and Two of the UP Charter?"

They were uncomprehending.

Guy sighed. "I thought every

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schoolkid learned them by heart. They go like this. Article One: *The United Planets organization shall take no steps to interfere with the internal political, socioeconomic, or religious institutions of its member planets.* Article Two: *No member planet of United Planets shall interfere with the internal political, socioeconomic or religious institutions of any other member planet.*"

"You mean," Teucer accused, "you're not allowed to help us?"

Guy shook his head. "Not by United Planets law. What happens on Amazonia is strictly the business of Amazonia and nobody else's. If we employees of UP began to stick our noses in the affairs of the Hippolyte, she'd simply drop out of the organization, and, if we continued to interfere, it would mean war. And, I assure you, a thousand other member planets who don't wish their internal affairs to be pried into, would take a very dim view of the UP Space Forces being aggressors against a planet which has shown no hostility to other worlds."

Zeke blurted hotly, "Then what do you do? What good is the nardy organization?"

Guy Thomas waited for him to cool off before going on. "We explore and patrol space. We try to promote trade and foster progress. If the medical researchers of one planet discover an improved cure for cancer, or whatever, we make every effort to spread the new discovery, avoiding, of necessity, such planets as Eddy, which was colonized by Christian Scientists. If some planet seems about to interfere with the affairs of some other, then we take the most aggressive step in our power. We send the fleet, in all its might, to go into protective orbit about the threatened world. Never has actual combat ensued, the warning is sufficient. The UP fleet, needless to say, could blow the strongest planet into nothingness within split seconds. It has never had occasion to, obviously."

Teucer glared at him. "Why'd you bother to come, then? You aren't willing to help us! You'll stand by and let a billion men and more be treated like slaves, like zombies, like . . ."

Guy said mildly, "I haven't been on Amazonia very long, admittedly, but from what I've seen you have a surprisingly advanced technology. This is by no means one of the have-not worlds."

"Yes!" Teucer snarled. "And why? Because we men produce it. We slave our lives away and don't even have a voice in the nardy government that shoves us around like we were children. You don't know what it's like, Thomas! Why'd you bother to come?"

"I'll answer that," Guy said cautiously. "First of all, realize that although the UP Charter ties the hands of the Octagon when an appeal like yours comes through—there have been others; the United

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Planets is not composed exclusively of Utopias. Though our hands are legally tied, we are not insensitive to your situation. I am, of course, incognito. I landed in the guise of an expediter from the Department of Interplanetary Trade, to arrange a deal between Amazonia and Avalon. My real job is to locate you people and get the full story."

"But what good can it possibly do us?"

Guy Thomas said very carefully, "You never know. Just out of curiosity, what is it you need to promote your cause? Money? I never heard of a revolutionary organization that didn't need money."

"Money?" Teucer grunted bitterly. "We don't use money here."

"That's right, one of you mentioned that. How do you carry on exchange? There's always some equivalent to money."

"Not on Amazonia. There is no exchange. We keep telling you, this is the most far-out dictatorship you ever ran into in all your United Planets."

Guy was frowning puzzlement at him. He said, "On anarchist planets, such as Kropotkin, yes. I can understand no medium of exchange. They utilize simple barter. But an advanced world such as Amazonia?"

The scarecrow of a man wrenched a wallet from a purselike affair that hung from his belt. He pulled a plastic card forth and shook it at the agent from Earth. "I work, see? Every hour I put in is credited to me in the computers. Every time I spend something, I put this card up against the credit screen and the amount is deducted."

"What amount?" Guy said. "You said you didn't have money."

"Suppose I want to buy a camera. They've figured out just how long it took to produce that camera, the number of hours to extract the aluminum in its body, the time to grind the lenses, everything. The total number of hours involved. Say it's two hours. Then it costs me two hours of my time—I work in sewage disposal—to buy the camera. The computers keep track of the whole thing."

Guy said, "Well, suppose you wanted to buy a hovercar, something like that which would take hundreds of hours to produce?"

"What do you think? The computers won't let me buy it until I've saved up that number of hours."

Guy was frowning. "You say you work in the sanitary system. But suppose another man was a . . . well, research chemist, a highly trained scientist. How would he be awarded these hour credits?"

"Exactly the same," Zeke said in disgust. "The smartest man in the country doesn't get anything more for his time, than the dumbest moron. In fact, he gets less, if

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you want to look at it that way. The moron gets taken care of for free, the big brain has to work if he wants to eat."

Guy thought about it for a while. "There's no way for you to get ahead, really, eh? What's your initiative? Why bother to try at all?"

"Initiative!" Zeke said, still bitterly. "Our initiative is that we like to eat."

A window was beginning to gray with the first of dawn. Guy, shaking his head, finished his wine and said, "There's a lot still to go over but I suppose it'll have to wait until I meet this Damon of yours. How can we get in touch with each other?"

"Where are you staying?" Zeke said.

Guy told him.

"One of those semi-prisons for single men," Teucer sneered.

"Thus far," Guy told him, "it's been quite comfortable."

"Jails can be comfortable, but they're still jails."

Zeke said, "All right, all right, Teucer. We can't convert him all at once. Listen, Guy, I don't know if we can contact you there or not. I don't know what kind of guard they've got over you. We'll find out; we've got spies everywhere. But you can always reach us here. This is one of our drops. If anything happens to this place, here's the address of another." He handed Guy a paper. "Memorize it, and destroy it. We take every precaution we can, but I guess you can be trusted. I guess you're more up on these things than we are."

Guy said, "Why do you guess that?"

Zeke looked at him. "I get the impression this isn't the first assignment of this type you've been on."

Guy said nothing to that.

Zeke said, "The first impression you give is kind of ineffectual, but if you look below the surface . . ."

Guy Thomas shrugged and came to his feet. "You can trust me," he said. "I'd better be getting back."

"You've got a shooter, eh? You said you winged whoever it was tried to crisp you."

"Yes, I'm armed."

"How'd you ever get it past those custom mopsies? They've got a reputation."

"We've got ways," Guy said shortly.

Zeke saw him to the door.

Before leaving, Guy said, "How many men do you have in your organization, Zeke?"

The other hesitated. "Active? Thousands, tens of thousands. I mean real members of the Sons of Liberty. But inactive sympathizers who'll rally round when the time comes? At least half the population. Half the men, that is."

Guy said slowly, "How many of them are like Teucer?"

Zeke scowled, uncomprehending. "What's the matter with Teucer?"

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Guy said, "He's not the most educated type in the world, and he's on the emotional side. I've seen revolutionary organizations before, Zeke. In the clutch, you want . . ."

"Aw, Teucer's all right. You got to get used to him."

"How many have you got like Teucer?" Guy repeated.

Zeke rubbed the bottom of his chin with a beefy paw. "Too many," he growled. He opened the door for the Octagon operative. "He's from Lybia," he added. "On the run from the police over there. We're hiding him out temporarily, till we can figure where to use him."

As a safety measure, Guy took a different route home, and covered the distance considerably more cautiously than he had in coming.

His gun was handy to his fingers, and he stopped at each street crossing, looking both ways. He wanted no repetition of the ambush of a couple of hours earlier. Pure luck had saved him there and pure luck blesses you seldom twice running.

The slower pace he had to take, to eliminate any further chance of attempted assassination, conflicted with his need to get back to his quarters before full dawn. He agonized, but there was nothing for it.

By the time he reached the sanctuary, it was too light to attempt to scale the wall to his window. Too great a chance that he would be spotted.

He marched deliberately up to the door through which the major had ushered him, some hours earlier, grasped the knob and pushed his way through. Again he was surprised at the lack of guard, or even lock. To hear the major and the others, a man wasn't safe in the vicinity of a warrior who had less than three husbands in her home. How did this jibe with the fact that this building full of bachelors was so easily entered?

He started up the stairway to the second floor where his small suite was located.

A voice tittered, "Oh, good heavens! Where have you been, darling?" It was Podner Bates, coming down.

Guy said, making his voice grumpy, "I couldn't sleep. I decided to take a walk."

"A walk! Artemis! Dear boy, don't you realize your freedom isn't worth a flicker, not a flicker, out on those streets? Suppose some young warrior had spotted you?"

They'd met halfway down the stairs.

Guy said, "Search me. What would have happened?"

Podner flicked his wrist, flabbergasted. "My dear, haven't you been informed at all? Any warrior whosoever who spots you and decides she likes you, can simply place her hand on your shoulder and say, *I thee take*. Your only recourse, if you object to being taken under her wing, is to throw yourself on the

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mercy of some warrior you like better. If she refuses you, for whatever reason, darling, then you must"—Podner arched his eyebrows—"give yourself to the one who claimed you."

Guy said, "I was just walking along the street, trying to think, getting a breath of air. How'd one of these warriors know I wasn't already married?"

Podner fluttered, even as he turned to accompany Guy back to his suite. "Darling, you're so naïve. You see how my tunic tucks up over my shoulder here? That proclaims me a widower. I am eligible for the taking, of course, but"—he cleared his throat delicately—"virgins are really in demand."

"Virgins?" Guy said blankly.

He looked at the shoulder of his own tunic.

"Your garb," Podner tittered, "proclaims you to one and all a virgin."

Guy Thomas closed his eyes in pain.

VI

Podner Bates saw him to his suite, gossiping along as they went.

Guy felt a coldness in his stomach. Along the way, had he run into any man-seeking Amazon, it would have meant either a matter of shooting her, or submitting to the damndest marriage custom he had ever heard of.

I thee take, yet! How informal could you get? And didn't the man, or even the man's parents, have anything to say about it? In all his readings on far-out societies, and they had some dillies in United Planets, Guy Thomas had never run into one quite this cavalier.

"How come?" he blurted to Podner, in protest.

"I beg your pardon, darling?" They were nearly to his door.

"Why's it so easy for a . . . a warrior to latch onto any man who comes along? Isn't there any way of avoiding being up for grabs?"

"Oh dear," Podner sighed. "It's so hard to realize you aren't familiar with our ways. It seems so natural to me, darling. Well, let me think. I *have* heard that wooing is somewhat different on your unnatural planets."

"Unnatural?"

"Where"—Podner giggled delicately—"we boys dominate. It's so hard to believe, isn't it? Anyway, I understand the Goddess Artemis first revealed her desires pertaining to a warrior taking a mate, when the early colony ships set down on Amazonia. She saw in her infinite wisdom that the need was to be"—Podner coughed gently—"fertile and populate the land. Girls were proclaimed warriors at the age of fourteen, and everything facilitated to hurry them into a relationship. If the medicos permitted, the first child was on its way at not later than fifteen." Podner giggled. "As you can imagine, obstetrics was

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quite our foremost science. It has progressed to the point where a warrior is inconvenienced for but a week or so."

Guy shook his head, his hand on the doorknob of his suite. "Thanks for the information. I'll know next time, to be more careful. I'd appreciate it if you didn't tell the major about my little jaunt. She had already told me to stay put."

Podner fluttered a hand. "Oh, don't you worry. I'm no tattletale. We boys have to stick together."

Guy Thomas closed the door behind him and looked wearily in the direction of his still as yet unrumpled bed. But then he did a quick double take. His eyes were suddenly wide, sleep forgotten.

The room was a shambles. His things had been ransacked, and no effort made to disguise the fact. He stood rooted, his mind whirling. This made no sense at all. It made no more sense than his being shot at on his way to contact the Sons of Liberty. There was no reason for him to be an assassin's target. There was no need to ransack his belongings.

He began gathering them together. He had had no time, earlier, properly to unpack, and his clothes and personal belongings had remained in his luggage. Now they were scattered about the bed, on the table, on chairs. Some of them thrown to the floor.

His tool kit had been emptied, helter skelter, on the table top where he himself had assembled his gun, earlier, from its disguised component parts. He went over each item he had brought with him from Earth, in careful memory. For a time, he could find nothing missing, but then a cold fear went through him. He sought frantically.

His communicator. It wasn't actually gone. He found it, or rather its remains. Someone had obviously deliberately crushed it with his heel and then kicked it under the bed, as though in contempt.

His communicator.

He had lost his only method of contact with either the UP Embassy on its artificial satellite, or with Earth itself. He was stranded on the planet Amazonia, from which no man had ever been known to escape, save the revolutionist Sarpedon, in the memory of any living person.

Guy Thomas was baffled. But who? It made no sense. No sense at all. Podner Bates came to his mind. The only person who knew he was here, save the major and her underlings. The major? But why? They had searched his things with painful care, there on the ship. There was hardly reason to search them again. Besides, who could possibly have known he wasn't in his room? Who could have expected to burglarize without resistance on his part?

Burglarize? No. Nothing was gone, even such things as personal jewelry, which would have had val-

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ue to any second-story thief. Nothing was gone, nothing bothered, save his communicator. The only thing that made sense at all was that someone had known he wasn't in his rooms and had entered deliberately to find and destroy his communicator.

And there was just one hole in that theory. The sophisticated communication device was not even known to exist outside the bounds of his own department, and his department was a close knit, dedicated outfit, far beyond all others in UP.

Guy Thomas had had too much tossed at him in the past twenty-four hours. He threw himself, face down, on his bed, arms wide. He was asleep in moments.

He awoke surprisingly rejuvenated, at half past eight. He made his way into the elaborate refresher room, shedding his slept-in clothing as he went and was fully under the spray before allowing himself to dwell on the past and the future.

The past twenty-four hours bewildered him, and after only a quick mental review, he refused to dwell further on what had developed. He had too much to consider in the future.

When he had allowed the refresher to bathe, shave, trim his hair and massage him to glowing pinkness, he issued forth and began opening closets and drawers in search of fresh local raiment. He assumed that they had outfitted him with a supply and found he was correct.

In slipping into a tunic, he tried for a time to adjust the shoulder in the manner that Podner Bates had his. It didn't work. The tuck was built in. He was going to have to remain a potential prey to any Amazon on the prowl.

Dressed, he went over to the orderbox which sat on the table next to his bed and flicked on the switch. He noted that the instrument was almost identical to those on Earth or of any of the other most advanced worlds. The Amazonians, obviously, kept up with developments; he was again impressed.

He said into it, "My breakfast, please, and if Bachelor Bates is available, could he come to my room?" And then he added, "Are there newspapers?"

"No, Bachelor Thomas."

"Well, how do I tune on newscasts? What's the drill for getting the news?"

"I do not understand what you mean by news, Bachelor Thomas," the orderbox said. The voice was feminine, he noticed. Or what passed for feminine on this forsaken planet.

"News news," he said, surprised. "The day's developments on Amazonia and throughout United Planets, for that matter. Political events, scientific developments, sports results, fires, wrecks, air and spacecraft crackups if any, criminal cases, that sort of thing. News."

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There was a pause. After a moment, the orderbox said, "We are sorry, there is no such service on Amazonia, Bachelor Thomas. Such material is issued in weekly magazines and submitted to those involved." The voice faded away, leaving him taken aback.

In all his career, he had never even heard of a planet which had no method of dispensing fresh news. He shook his head. Could the Amazonians be so self-satisfied with themselves and their way of life that they had no interest in interplanetary affairs? But even if so, they'd certainly want to know of the developments of their own world. It was just one more for the book from a culture that had already surprised him beginning at chapter one.

Podner Bates arrived with the breakfast, which was pushed into the room on a small cart powered by a youth of perhaps eighteen—a youth who giggled. Evidently, he found Guy Thomas almost unbearably amusing. The hell with it, Guy decided. He waited until the giggler left.

Podner said archly, "Well, darling, did we spend a restful night, finally?"

Guy, even as he shot a disdainful glare at the other, sat down to his food. Bachelor Bates was the prime suspect, so far as the burglarizing of his room was concerned. If it hadn't been for the mystery of the earlier assassination attempt, which he didn't think Bates could have possibly pulled off, and which he suspected was connected with the robbery, he would have accused the other.

"Have some coffee," he said. "That is coffee, isn't it?"

"Oh yes, but I never touch it, darling. I've heard it's simply terrible for the complexion, and a boy my age has to watch himself, you know."

Guy grunted. There was enough food on the table for a squad of men his size. What was undoubtedly a citrus fruit drink, eggs, sausages, enormous slices of bacon, bread, toast, rolls, various jellies, coffee and cream. Evidently, he decided, the early colonists of Amazonia hadn't depended on local flora and fauna but had brought both animals and plants from Earth. There had been some adapting to the new world, but the food was still highly recognizable. There was an extremely delicate, nutty taste to the bacon. Gourmets would have drooled over it back on Earth.

Guy downed a sizable glass of citrus juice and began to load his plate. After yesterday's activity, he was famished. He said to Podner, who was eyeing him tolerantly, "I don't know when the major's going to turn up but until she does, I'd appreciate it if you'd brief me on the workings of Amazonia."

"But, I'd love to, darling. Just what would you like to know?"

"Just about everything, damn it.

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The longer I'm here, the less I seem to understand. I tried to study up on your world before I left Earth but just about everything I could find now seems worthless."

"Dear boy, I'd gladly tell you everything, but I simply wouldn't know where to start."

"Start with history," Guy said around a bite of eggs. He wondered if they were hen eggs, decided they probably were. Man had taken the hen with him, as he had the pig and cow, to just about every world that would support his life form. A luxury, but one invariably indulged in.

Podner shifted in his easy chair, delicately. "Well, dear, I suppose a history of Amazonia begins on Earth as does the ultimate history of any humanity settled planet."

Guy said, trying the sausage, "Let's hurry along, the major might be here any time."

"Of course, darling," Podner fluttered a hand. "I'm such an old ditherer. Well, as you undoubtedly know, the Amazon story is part history, part legend, part myth."

"I thought it was all myth."

"Then you were mistaken," the other said primly. "The Greek legends and myths are based on the existence of arms-bearing priestesses of the Moon Goddess, the White Goddess, along the southern coast of the Black Sea. They continued far into the period when the Doric Greeks had swept the Goddess-worshiping Pelasgians from Greece proper and had instituted patrilineal descent and rule by men. These tribes were at their most powerful along the Thermodon River where Queen Lysippe built the city Themiscyra."

"Lysippe?" Guy interrupted. "That's the name of one of my guards."

"Of course, dear boy. All the warriors and most men take their names from antiquity. Myth tells us that the Amazons established a considerable empire in Asia Minor and up into the Caucasians and beyond, north of the Black Sea." Podner made a move. "However, the truth probably is that this is myth alone. By the time Homer and the other bards came on the scene, the tradition of the arms-bearing priestesses was confused with heroic tales of warrior women who seared off one breast so they could shoot their bows better, and who supposedly invented the use of cavalry in battle. Actually, you know, the name Amazon is derived from *a* and *mazos* meaning without breast. Silly, of course."

"Um-m-m," Guy said, pouring more coffee.

"The stories that come down to us are largely nonsense. Heracles being sent by Eurystheus to fetch the golden girdle of Hippolyte, the queen of the Amazons. Among other things, of course, the institution of queens and kings was unknown at that time. Society hadn't developed to the point. War chiefs, head

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priests and other tribal officials were evolving, but the conception of a king or queen had yet to show itself."

Guy took in the other. Podner Bates didn't sound quite as flighty as first impression might have indicated. He wondered again how deep the other's waters ran. And what purpose he might possibly have had in searching Guy's rooms for his communicator—a device the Amazonians supposedly didn't even know existed—and destroying it.

"The stories are confusing," Podner sighed. "Some say that Hippolyte gave the brute Heracles her girdle and war ax, after falling in love with him. Some say that Heracles killed her and took the girdle and then had to fight off her followers. Still others claim that Theseus captured Hippolyte and gave the belt to Heracles."

Guy said impatiently, "All this isn't very important. Let's get down to modern times."

"Just one other thing. In antiquity," Podner said, fluttering a hand, "there were two groups of Amazons, you know. One based on the Black Sea, the other in Lybia. The Lybians were also based on history, the actuality of arms-bearing priestesses of the Moon Goddess, Artemis. Their most famous queen was Myrine who fought the Atlantis soldiery near Lake Tritonis in northern Africa, which was, of course, considerably more fertile in those days. She beat them and built up a considerable empire in Africa, Asia Minor and even some of the Aegean Sea islands. All nonsense, of course.

"However, there is one interesting bit that has come down to us. The Phrygian blessing, which was originally given in Myrine's name, involved finger magic, and calling upon the three Idaean Dactyls, or fingers, who supposedly dispensed doom. One Dactyl represented the middle finger, Heracles was the thumb and the third Dactyl was the index finger. These three raised, while the fourth and little finger are turned down, made the Phrygian blessing. One of the Christian sects still use it in the name of the Christian Trinity."

"What's all this got to do with here and now?" Guy said.

"Oh dear, I'm so sorry. I do dither, so. I was just trying to give you the background for present day Amazonia. We have the two continents, Paphlagonia, with this, our capital city, on the river Thermodon, which carries on the traditions of the old Hippolyte's realm, and the continent Lybia, with its capital Chersonesus, which carries on those of Myrine."

"Why all the jetsam?" Guy was wiping his mouth with his napkin.

Podner Bates made a gesture with his limp hand. "Oh, you know how it is with social movements. When the founders of this colony

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were recruiting the women necessary to populate the new world, they needed all sorts of slogans and symbols. Since they were so staunchly feminists, what better symbols could they have used than the ancient Amazons? Frankly, darling, I think they've done remarkably well at this sort of thing. It's really quite inspiring, all the pomp and parade and all. The youngsters just eat it up. Traditions are very necessary, I've always said, the very backbone of a culture."

Guy looked at him wryly, "How about the boys? Do they eat it up, too? All these traditions of women warriors and women-dominated society?"

The other's eyes were wide. "But, of course. I'll never forget sitting at my father's knee, thrilling to his account of the warriors of the past and the desperate battles the heroines fought against the treacherous Greeks who came to destroy society as the Moon Goddess had so long directed it, and change women into slaves."

Guy Thomas began to open his mouth, but shook his head and held his peace. The hell with it.

He said suddenly, instead, "Look, don't the men ever react against this situation? Hasn't there ever been revolt? You know, the men trying to establish the same sort of setup that exists on Earth and most, if not all, the other planets the human race inhabits."

"Good heavens," Podner gasped "you mustn't say such things."

"Why not? I'm just asking for information. Isn't there any sort of masculine underground? Some sort of revolutionary organization that would like to turn society upside down and make men, if not superior, at least equal to women?"

Podner made a motion as though to hold his hand over his ears. "Oh, dear boy, you don't know what you're saying. The Goddess would never permit such a sacrilege. Women are the natural superiors of man. It says so in the holy books."

"I'll bet it does," Guy said grimly. "I never heard of a holy book that didn't support the powers that be. But you didn't answer my question."

"Well," Podner said primly, "you can just be sure there is no such organization. We men, here on Amazonia, know our place." He added, archly, "Whether or not they do on *other* worlds, where the natural nature of things has been subverted."

Of a sudden, Guy Thomas had a surfeit of the other. "Aw curd," he growled. "Get out, will you? I've got to get ready for the major."

Podner was on his feet, his lips a thin white line. "My dear boy . . ."

"And stop calling me a boy! You make me sound like a molly."

"Well . . . *well* . . . !"

In a huff, Podner Bates swept out of the room.

Guy rubbed a hand over his mouth. "I shouldn't have done

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that," he muttered aloud. "Poor cloddy."

He brought his two guns from beneath the bed's pillows and considered them. There was no reason to believe he was going to be allowed into the presence of the Hippolyte armed, and he didn't dare leave the weapons here. For all he knew, the suite would be shaken down again, the moment he left.

He brought his tool kit out once more, took his original gun apart and disposed of it by reuniting the four parts with pseudo-tools, as they had originally been.

He then went to the window, opened it and looked out with care. He could see no one near enough to make any difference. He tossed the weapon he had captured the night before into a heavy bush in the garden below.

He closed the window again and returned to the table to see if there was a final cup of coffee. He needed time to think, and doubted if he was going to get it.

He didn't. The major's face was on his door screen within minutes.

She was brisk. She hurried through the usual amenities of bidding him good morning and asking after his rest, and then indicated that time was a wasting.

"Will I need my tool kit?"

She scowled. "I wouldn't think so. You're going to meet the Hippolyte and her advisers."

He followed her out of the suite and down the stairs to the entry. It occurred to him that thus far he had seen none of the inhabitants of this bachelor's sanctuary save Podner Bates and the boy who had wheeled in the breakfast tray this morning. That had strange aspects, there were a good many apartments in the place. Was he being kept secluded?

Clete and Lysippe were awaiting them on the sidewalk before the sanctuary, both gave him a leering grin.

Clete said, "Morning, Sweetie. You know, I think you looked prettier in that over-space men's suit you wore on the *Schirra.*"

"Knock it," Guy muttered at her.

"My," Lysippe said, "our boy's in a nasty temper today. And he seemed like such a nice inoffensive tad, up there on the ship. He must've been on his party manners."

"Shut up," the major rapped, "and let's get going."

There was a sudden shuffling noise and all turned.

Around the corner of the sanctuary darted a figure. It was obviously a woman, although she held her military cloak up about her face.

She came running hard, full at them.

Instinctively, Guy Thomas's hand darted for his belt. There was nothing there. His gun was upstairs!

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His three guards had gone on beyond him, opening the doors of the hovercar, the major beginning to slip into the seat. He was nearest to the newcomer.

She began to shout, *"I thee . . ."*

"Holy Jumping Zen!" Guy blurted. He took off like a shot, around the car, the woman pounding after him.

"Hey!" Clete yelled.

"Hands off, you cloddy!" Lysippe shouted. She tore for her gun, and managed to foul it in its holster in her attempt at speed.

The major, half in, half out, of the hovercar, stood paralyzed, her eyes goggling.

Guy completely rounded the car and headed desperately for the garden where he began dodging in and around rose bushes, the Amazon warrior immediately behind.

He had been the better part of a month on the *Schirra,* a month in which he had had precious little exercise. Besides that, the air seemed just a bit thinner on this world than he was used to on his home planet. He didn't seem to be achieving the speed of which he should have been capable.

Lysippe was bringing up the rear, trying to catch the newcomer before that desperate female was able to lay hand on her charge.

In the background the major was shouting in wrath.

From the side of his eyes, even as he darted, Guy Thomas could see Clete, holding her sides and leaning up against the sanctuary wall, screaming laughter.

Some joke!

He scooted around a bush, headed back for the entrance of the building. He didn't know exactly what the word sanctuary added up to, in this case, but there was a good chance it meant warriors, husband bent, weren't allowed to enter. Perhaps all marriage rules were off, where Podner Bates and his fellow bachelors resided.

He slid on the gravel and went asprawl. And didn't bother to attempt to recover. He closed his eyes in surrender. He'd had it. He waited for the hand on shoulder, the dreaded *I thee take!*

More shouting and more uncontrolled laughter. That last from Clete, of course. Some guard!

He opened his eyes carefully to take in developments. Lysippe had evidently grasped the newcomer around the waist and was holding her, whilst the major came storming up, massacre in eye.

She faced Lysippe and her prisoner, hands dangerously on hips.

"Minythyia!" she blurted, enraged.

Lysippe released her grip and Minythyia shrugged her cloak back around her shoulders.

"You can't blame a warrior for trying," she said defiantly. "He's the cutest trick I've ever seen."

"Is this your idea of a joke!" the major snapped dangerously.

"Joke?"

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"You know how important it is that this funker of a man clear the way for interplanetary trade with Avalon!"

Minythyia twisted her full mouth stubbornly. Under other circumstances, far different circumstances, Guy Thomas would have thought of her as a far from unattractive girl, and certainly most suitable to take out on a free-wheeling date with intentions of making such headway as was possible. But the very thought made him groan now.

She was saying, "Oh, he could finish all that jetsam right here on Amazonia. He wouldn't have to leave. He could handle our end of it here, and we could send a representative to Avalon to take care of the other end."

The major said coldly, "That isn't the way the Hippolyte and her advisers have decided to do it."

Minythyia growled, still stubbornly, "You know nardy well as soon as he gets into that slew of sex maniacs that hang out at the palace, he won't last minutes before one claims him. And even Hippolyte can't interfere with the marriage laws of Artemis."

Guy groaned despair as he came slowly to his feet, brushing a skinned knee.

Clete hustled him into the car, still chuckling, whilst the major and Lysippe, taking no chances, stood between him and the deep-breathing Minythyia who still eyed him, half desperately, half wistfully.

VII

Underway in the hovercar, the major, seated next to Guy in the front seat, turned around to face Clete and Lysippe. "Were you two in on that?"

They were both wide-eyed in innocence. "Artemis!" Clete said. "Of course not. We're the poor boy's guards."

Lysippe said, "Didn't you see me grab her?"

The major snorted but turned back.

Guy was finally regaining his breath. "That was close," he muttered.

"Minythyia's too slow on her feet," Clete explained to him. "You're lucky it wasn't one of those sixteen-year olds. They're the worst." She added thoughtfully, "In more ways than one. They don't really know what to expect . . ."

"Shut up," the major growled.

Clete chuckled.

The drive was a fairly long one, especially through Themiscyra prenoon traffic. Not that Guy saw any of the latter. The major had turned the windows opaque and growled a surly negative when he requested the polarized view.

He said eventually, out of a clear sky, "All men aren't like Podner Bates, are they?"

The major scowled at him. "How do you mean? What's wrong with Bachelor Bates? I've always thought him a charming fellow."

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"But he's not exactly an average Amazonian male. At first I thought he was."

"Podner's more or less like all men," the major said. "What brought that up?"

Come to think of it, except for the space launch pilot and the boy who'd brought breakfast, Podner was the only man he was supposed to have met thus far, Guy realized.

"Nothing," he said. He thought about it some more. Podner was certainly similar to neither Zeke nor Teucer. But, then, they were revolutionists and so off-beat.

The major said, "Is there any chance of finishing your business today?"

He turned and looked at her, his eyebrows high. "I hadn't thought of that," he said. "It doesn't seem very likely."

"Why not?" the major rapped. "You'll be meeting our technicians shortly. If you can finish your business and get the final approval from the Hippolyte, we could run you out to the UP Embassy. You'd be safe then."

"Aw," Clete said, "he's safe with us. Minythyia won't get him."

Guy said, his voice worried, "I was thinking in terms of seeing your mines, your smelters, your extracting system. From what source do you extract your iridium? From osmiridium, I suppose, although on some planets . . ."

"How in the name of the Goddess would I know?" the major said, bringing her cloak up tighter about her neck. "All I know is you seem to be on the philosophical side about getting nabbed by one of these man-short cloddies."

"It's like I said. A boy doesn't really feel fulfilled until a warrior's taken him under her wing," Clete told them.

Guy grunted disgust at that opinion. "I've got my work to accomplish," he said. "When that's done, I'll depart Amazonia so fast . . .' He let the sentence fade off.

"This must be it," Lysippe said. "Sweetie, you stick as close to Clete and me as you can. We'll take care of you"—she glared at the other guard—"if Clete doesn't go into another laughing fit."

They were obviously going up a lengthy driveway. The major turned the window knob, allowing them to see out. Guy was impressed. It was an imposing layout, all very Grecian motif. Obviously, public buildings. Was the largest the palace?

If it was, they didn't immediately head for there. The hovercar whooshed them, instead, to a comparatively sober looking building faced with stone rather than marble. They came up before it, the car stopped and Clete and Lysippe issued forth first, looking up and down with care before opening the front door for Guy.

"*Now* you start being careful," he said bitterly as he came forth. "After that dizzy curve almost got to me back there."

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Clete snorted. "You're in more danger here than you were there, Sweetie. For one thing, Minythyia isn't so bad."

He didn't ask her to elaborate on that.

Up the wide stone stairway the major led the way. Guy followed, with Clete and Ysippe on each side and slightly to the rear.

At the door, two sentries sprang to the salute. Guy Thomas took in the short, stubby scrambler guns they carried and winced. It was the most deadly handweapon he knew of in the whole UP confederation. Either of these Amazons could have leveled everything within half a mile's radius. What in the name of the Holy Ultimate did sentries need with a scrambler?

The major marched on through, Guy and his guards right behind. Inside, as on Earth, the antiquity motif dropped rather sharply away. The interior of the building was quite as ultramodern as would have been a business establishment on Earth or Avalon.

The major marched up to a reception desk behind which was seated a bright looking young man done up as usual in the tunic garb of the Amazonian male. Guy and his guards were still to the rear.

"Yes, Madam?" the receptionist said.

"Major Oreithyia with the Earth representative, Guy Thomas," she said with military snap.

The receptionist took a moment to scan Guy top to bottom in curiosity. He said kindly, "Welcome to Themiscyra, darling."

"Thanks," Guy grunted. He was getting tired of these endearments between men. At least the underground didn't seem to use them.

The other smiled tolerantly at the major and the two Amazon warriors. "Goodness, it's like we've heard. They're rather unmanly on the other worlds, aren't they?"

Nobody bothered to answer his sally. He said, a bit miffed, "You're being awaited in the conference chambers, down at the end of that corridor, Major." And then he blinked, as though he had noted the style of Guy's tunic for the first time. "Goodness me," he said. "A virgin."

Guy began to growl something at him, decided the hell with it, and gave up.

They marched down the indicated corridor, the major again ahead, the two warriors bringing up the rear. They reached a door.

Clete said, "Just a minute." Her hand on her gun, she opened up and looked in. Evidently satisfied, she opened it wider and stood to one side.

Guy Thomas followed the major inside.

It was a conference room that would have been duplicated, ten thousand times, in Greater Washington, or, for that matter, on practically any of the advanced planets.

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A long table, obviously of wood, Guy Thomas noted. Equipped with all the latest taping and other recording devices. Around the table were heavy, comfortable chairs, about twenty in all although there weren't that many persons present. Otherwise, there was little furniture.

There were six persons present and already seated at the table. Somewhat to Guy's surprise, half of them were men. They were the first middle-aged males he had thus far seen on the planet; in fact, one must have been at least in his sixties. The three women were in the same age group. The women were dressed, somewhat uncomfortably it seemed to him for some reason, in much the same garb as the major and her warriors, albeit a bit more conservatively and without weapons. The men wore what he assumed were standard garments for more elderly males, something like a Roman toga. They didn't seem to be particularly used to the dress; possibly it was only worn under special circumstances, and they anticipated being presented to the Hippolyte later on.

The major barked, "Citizen Guy Thomas, of the planet Earth, representative of the Department of Interplanetary Trade of United Planets."

One of the women, who sat at the table's head, took Guy in from top to bottom. "You look on the young and flat side to be holding down an important mission."

Guy said evenly, "I'm old enough and have the necessary background to handle the job." The old biddy looked like a warhorse. He would have hated to have worked under her.

"Just what *is* your job?" one of the men said. "We don't seem to be clear on just how far your authority goes, just how binding your decisions can be considered."

The old biddy said, "My name's Lampado. Take a chair, Citizen Thomas." She indicated and introduced the remaining five, giving some of them titles meaningless to Guy but obviously indicating some technical rank or position involving imports and exports.

Guy sat down, the major took a position against the wall where she could scan the entire room, and each of the girls stationed herself at one of the two doors.

Guy looked at the man who had asked the question. He had been introduced as Aeacus. Evidently, second names were seldom used on Amazonia. Bates, Podner's family name, was the only one he could recall having heard.

Guy said, "As I've explained before, I'm a United Planets expediter. Eventually, UP will step out of the picture altogether. I have no power to finalize a deal between Amazonia and Avalon, all I can do is gather preliminary information.'

"All right," Lampado gruffed "The Hippolyte has named us the committee to handle the initial con-

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ference. If you don't mind, first a few questions."

"Of course," Guy said. He had to watch himself now. He could spill the beans without hardly trying. These people were obviously trained technicians.

Lampado said, "Theseus?"

A keen eyed, overly heavy man who seemed even more uncomfortable in his toga than the others leaned forward. "We understand that this planet Avalon has a surplus of columbium. Frankly, Amazonia is largely lacking in this element and we had about decided to find an alternative. Our steel industry has utilized it in the preparation of stainless steel to prevent corrosion at high temperatures and to permit fabrication without added heat treatment."

Guy nodded thoughtfully.

Theseus said, "Do we understand that this Avalon has extensive deposits of niobite, the ore from which columbium is extracted?"

"Extensive," Guy repeated. "Far beyond her own needs."

"Very well," Lampado gruffed. "And we understand her own need is for iridium."

Guy nodded. "Correct. Although some iridium is present on Avalon, their use of platinum metals is so extensive that they need considerably more. Could you inform me whether you extract your iridium from osmiridium?"

Theseus said, "Yes, usually, although we also find some in the platinum ores."

Guy said, "It's not part of my assignment to explain Avalon's need of iridium, but aside from its usual industrial uses, she requires large amounts for her currency which is based on platinum. As you know, pure platinum is too soft and must be alloyed with iridium to the point of five or ten percent in order to be utilized."

Lampado said, "Well, there seems little doubt here. We can supply as much iridium as Avalon is likely to want, particularly after stepping up production, and can take as much columbium as she is likely to be able to ship us. What else is there to discuss, Citizen Thomas?"

Guy cleared his throat. "Possibly the most important facet of all. The basis of exchange. How are we to evaluate your iridium as compared to Avalon's columbium? I might suggest you put it in the hands of the planet Geneva, which specializes in just this sort of thing, a clearing-house problem. Her medium of exchange is gold, so practical down through the ages. It would be up to Geneva experts to work this out in detail with you both, but I understand that what it amounts to is that, on paper, she buys your iridium for gold, at the going interplanetary rate, and Avalon's columbium. She then sells you Avalon's columbium for gold, and sells Avalon your iridium for the same medium. Actually, of course, it is

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mostly paperwork. The gold never leaves the vaults of the planet Geneva."

They were staring at him.

Lampado blurted, "Why?"

Guy said, "I beg your pardon."

She demanded, "What does this parasite of a planet, this Geneva, get out of the deal?"

"Oh," Guy said. "Well, I understand it is based on volume. In this case, I doubt if they would require more than one percent."

Lampado rumbled in disgust, "Aeacus?"

Aeacus was rubbing the side of his face as though in confusion. He said, "See here. Why don't we trade with Avalon, even-steven? What is the need for this intermediary?"

Guy looked at him blankly. "You've got to have some exchange medium in common. Avalon's is based on platinum. One of the few in the system. I confess, I don't quite understand your own, but I assume it conflicts. What do you mean, even-steven? You certainly wouldn't expect to trade a ton of your iridium for a ton of columbium. The Avalonians aren't drivel-happy."

"Of course not," Aeacus said reasonably. "Our medium of exchange is the hour. Actually, so is theirs ultimately. Their platinum is actually valued, as an exchange commodity, according to the number of hours it takes to produce a given amount."

Oh, oh. He had run into this before. Who from? Teucer, the refugee revolutionist from Lybia. Guy scowled.

Aeacus said, "We propose to exchange with Avalon, hour for hour. The amount of man hours it takes to produce a ton of iridium will be traded for the amount of columbium that can be produced in that time."

Guy gave a quick shake of his head. "Look," he said, "suppose they have a higher degree of automation than you. Suppose in their niobium reducing plants only half a dozen men are required. In a hundred hours they could reduce one hell of a lot of columbium, but by your way of figuring, it wouldn't be worth much. Suppose, on the other hand, a lot of your mining of osmiridium and extraction of iridium is manual. Can't you see, it wouldn't be fair?"

"Not at all," Aeacus said, still reasonably. "The time expended in inventing, designing and building their automated plants would, obviously, be considered in the number of hours involved. Depreciation of plant is obviously a very important part in adding up the hours necessary to produce a given amount of columbium, or any other commodity. If our extraction of iridium was done by the primitive methods you suggest, then little plant would be involved, but actually, we, too, have considerable automation."

Guy was trying to assimilate it.

Aeacus pressed on. "The ex-

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change value of any commodity is determined by the socially necessary number of hours required to produce it."

Guy said, "Look, just about everybody else seems to think the exchange value of a commodity is determined by supply and demand."

Aeacus shook his head, as did all the others around the table.

"If that were so, what would happen when supply and demand equaled each other? Would the value simply disappear? Obviously not. Supply and demand can effect temporarily the price of a commodity, but not its real exchange value. And its price tends to average out at its real value."

Lampado put in with a snort, "Can't you see? If exchange value depended only on arbitrary prices set artificially, what you would continually win as a seller, you would lose as a buyer. We'd have a picture of two persons in the bottom of a well, selling hats to each other and both getting rich."

Guy said suspiciously, "Something is coming back to me. The so-called Law of Value. Wasn't it originally dreamed up by Karl Marx, a long time ago?"

"Marx?" Aeacus said frowning. "Oh, you mean the Nineteenth Century economist? No, actually the theory was first developed in 1721 by a young man named Benjamin Franklin in his first essay entitled, 'A Modest Inquiry into the Nature and Necessity of a Paper Currency.' He used wheat and gold as examples, pointing out that if the same number of hours of work were involved in producing a quart of wheat and an ounce of gold, then they were equal in value. A good many of those who came after Marx gave him credit for, or blamed him for, various teachings that never originated with the man. In fact, there are few scholars in history whose teachings have been so completely distorted—especially by his supposed followers."

"All right," Guy said. "Let's leave that for a time. How about this? How can you simply add all the hours together in a lump? Take your iridium production. Out in the mines you've got a man"—he cleared his throat—"or woman—a big brawny type, bucking a drill. Back at the plant you've got a chemist, who's running tests on the final product. This chemist spent ten years in school after the brawny yoke dropped out. He's *trained.* He's spent the better part of his youth getting that training. He's of more value to society than the drill bucker!" His voice had gone slightly high.

Actually, of course, the whole thing meant little to Guy Thomas and his real assignment. The Avalonians actually did wish to trade iridium for their surplus columbium but this expediter nonsense was a front. However, the argument had insinuated itself to augment the

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frustration he was finding everywhere on this madhouse planet.

Aeacus said, "But obviously when the yoke, as you call him, dropped out of school, he went into his chosen field, mining in this case, being paid the number of hours he expended. Your chemist continued in school for as long as he wished, so long as he could pass the examinations. When he finally finished his education, he, too, went to work in the mining and extraction of iridium."

"There!" Guy blurted. "He was a flat to spend all those years in school if he doesn't get paid any more than the unskilled driller."

Lampado leaned forward again. She said, unbelievingly, "Don't they pay students on Earth to go to school?"

Guy Thomas closed his eyes for a moment's communion with higher powers. "No," he said. Then, "How much do you pay a student, such as our hypothetical chemist, to go to school?"

"The same as anybody else," she retorted, as though the question couldn't have been sillier. "For every hour he puts in as a student, he accrues one hour. By attending school he is adding to his value to society. He is thus contributing to the common store of value."

"Look," Guy demanded. "Suppose he's *really* stute, see? He keeps on going to school. Every time they throw an exam at him, he gets top marks. O.K., he likes school. He keeps going and going, taking more and more courses. Finally he's sixty years old, or whatever. How old do you have to be to retire on Amazonia? Don't you see, if he spent his whole life studying and getting paid as much as anybody, he'd have never put in a lick of useful work in his life!"

The Amazonians, including the major and her two warriors, began to laugh.

Aeacus, chuckling, said, "Actually, of course, graduate students in our upper schools participate in both teaching and in research in their respective fields. I am afraid, Citizen Thomas, that it would be quite difficult for your scholar not to enrich our culture, as a whole, as a result of his learning. Much of it, I am afraid, would rub off, willy-nilly."

Guy brushed that aspect aside. "All right. But according to you, each hour of time expended is worth just as much as any other hour."

Theseus interrupted here. "What could be fairer? It is the one thing in which all men and women are equal, without exception. We all, no matter of what sex, no matter the age, how intelligent or stupid, how quick of reaction or slow, have exactly twenty-four Earth basic hours a day. Surely nothing is more just than to realize that each person's time is as valuable to her, as any other person's. It is the ultimate substance of existence—your time.

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What a crime is perpetuated if one person steals another's, by whatever means."

Guy Thomas took a deep breath. "All right, let's make this simple. Suppose you have a man making shoes. His reactions are quick, he's ambitious, he's diligent. He can make, say, four pairs of shoes in a work day. All right. Next to him is another fella. He's slow and strictly a cloddy. Even if he tries, and possibly he doesn't, he can't make more than two pair of shoes a day. You think the hours the stute man puts in should equal the hours the cloddy does?"

They all laughed again, to his irritation.

Aeacus said, "You make it too simple. In the very old days, when shoes were hand manufactured as you describe, then truly the first man's time was worth more than that of the second. But long ago that situation changed. It was found that if six men worked together, three of them, perhaps, cutting leather, another two sewing it together, another hammering on the heels, that instead of an average of four pairs of shoes being produced per man, that the day's total would be perhaps seventy-two pair. Three times as many, per man, than if they had been working as individuals. Division of labor multiplies man's efforts. Of this six-man team, one was the fastest, one the slowest, the others inbetween, but their combined efforts brought their average up to three times the production of the fastest."

"All right," Guy muttered, "I'll take that. Still, the fastest . . ."

"Just a moment, I haven't finished. That is still not it. Shoes are no longer produced by teams of six men, bent over a cobbler's bench. Instead, a highly trained technician watches gauges and dials and the reports of computers, while the automated factory in which he devotes his hours, pours out shoes at the rate of tens of thousands a day. This fabulous productivity of his is the accumulated legacy of the race. It does not belong to one person or group of persons, no matter how intelligent, quick or ambitious. That automated plant can operate only because half a million years ago one of our common ancestors first hit upon the use of fire. Only because twenty thousand years ago, perhaps, another ancestor devised the first wheel. Only because some long forgotten Hittites stumbled upon the smelting of iron. And so on. A hundred, a thousand, a million of our more inventive ancestors had to live their lives to give us this legacy.

"This technician who prowls the gauges and dials of the automated shoe factory, can he claim, he himself, to be turning out thousands of shoes per hour through only his own time? Obviously not. It is the whole human race, down through the centuries, which is producing them. For him to be so vainglorious as to de-

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mand more for the hours he puts in than a slightly less intelligent, or less agile, man is presumptuous. That legacy of the ages belongs to the less stute as well as our most fortunately endowed."

They were interrupted by a knock on the door which Clete guarded. She opened it and peered out. She grunted and opened wide.

A young man entered and nodded his head respectfully to Lampado. "Madam, the Hippolyte will be ready to receive the representative from United Planets in ten minutes."

"Very well," the committee chairman told him. "That's all."

The messenger left, after sweeping Guy Thomas with inquisitive eyes. At least he didn't giggle, Guy conceded sourly.

Lampado said, "We've spent too much time on nonessentials. But to sum it up, Citizen Thomas, Amazonia is as desirous as Avalon to exchange columbium for iridium. We suggest that the trade be based on the number of hours expended to produce the respective products. If this is unacceptable to Avalon, we welcome their further opinions on the subject."

"That's the message you wish me to take to Avalon?" Guy said.

The major, silent all this time, said, "Always subject, of course, to the approval of the Hippolyte."

Lampado gruffed, "Of course."

The committee members began to come to their feet, stretching and smoothing out their togas and warrior's cloaks.

Guy stood, too, and approached the major. "Look," he said, "brief me a little on this setup. The more I hear about the workings of your society, the less clear I seem to be. Do I understand that the Hippolyte is queen of this whole continent?"

Aeacus had overheard him. "Don't be silly," he snorted. "How could you have an institution as out of date as a feudalistic nobility in a culture as advanced as Amazonia? Even as figureheads kings and queens had largely disappeared before the first landing on Luna."

The major glowered at him. "Let me handle this."

The elderly scientist looked contrite. "Sorry, Major," he said.

She turned her eyes back to Guy Thomas. "The term 'queen' is antiquated. The Hippolyte is the elected head of the four *phylons,* or tribes, of the Paphlagonian Amazons. The office is held for life unless the electorate deposes her."

Guy said, "Who composes the electorate?"

"The four heads of the *phylons*," the major told him as though nothing was more obvious.

He cleared his throat. "All right. How do they get to be heads of the, uh, *phylons*?"

"Each *phylon* is composed of ten *phratras*. The elected heads of the ten *phratras* elect the chief of their respective *phylon*."

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Guy looked at her. "I know I'll get to the bottom sooner or later," he muttered. "Who elects the heads of the *phratras*?"

"Each *phratra* is composed of ten *genos*. The elected head of each *genos* votes for the chief of the *phratra* to which he belongs."

"And . . ." Guy said patiently.

The major wound it up. "The *genos* is the basic unit of our society. Its membership has a common name, going back to a supposed common ancestor. All members of the *genos* have certain rights and duties toward their fellow members."

"Kind of a great big, happy family, eh?" Guy said.

"Exactly. It is a type of family, but composed of thousands of persons."

"And each adult member has the right to vote for the person who represents the *genos*, eh?"

The major became slightly huffy. "Don't be ridiculous. Not the men, of course."

"Oh," Guy said sarcastically.

The major said, "Today, the Senate, which is composed of the heads of each *genos*, is not in session. You will be received by only the Hippolyte, flanked by her council which consists of the four *phylon* chiefs. When you are presented, you will bow and remain silent until addressed." She added, "I'll stand next to you. The Hippolyte seldom bothers with men, of course. Try not to make a flat of yourself."

Guy said in a sarcastic tone, "I'll do my best."

Her eye turned bleak. "Don't be cute with me, boy. I'm handling this job because I was ordered to. But I don't like uppity men, understand?"

"I suspected it all along, Major," Guy got out. "Let's go."

Out in the corridors again, they fell into their old pattern of precedence. The major led, followed by the Earthling, followed in turn by guards Clete and Lysippe.

It would seem this building connected to the palace, or wherever it was that the Hippolyte held audience, by an underground passage. At any rate, they stepped into what Guy at first assumed was an elevator, but it turned out to be an elevator with ramifications. It sank, that feeling he could recognize, but at what he would have assumed to be the bottom of the shaft, no door opened. Instead, they began to move swiftly sideways. This continued for several minutes until they stopped, shunted this way, shunted that, for a short distance, then began to mount again.

"What is this?" Guy growled. "An amusement park ride?"

"Shut up," the major rapped.

"Shut up yourself," he snapped back.

The three of them stared at him.

Finally Clete laughed. "Sweetie," she said, "you're the most effeminate man I ever saw in my life.

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Damned if I know what Minythyia sees in you. She'd have to spend the first year teaching you your place."

"That'd be fun," Guy muttered. He was getting fed up with this chaotic relationship between the sexes. On top of everything else, that description he'd just had of the workings of the Paphlagonia government made about as much sense as anything else on this crackpot world. What were the duties of these layers upon layers of elected officials? Who profited by what? Who was the dog catcher, and who the Minister of War?

The car he had mistaken for a simple elevator stopped and the door opened quietly.

His eyes widened in shocked disbelief.

They stepped into the biggest, gaudiest hall he had ever seen in his life. It made the surviving cathedrals of antiquity on Earth, at Rome, Seville, Rheims and Istanbul look like peasants' huts in comparison. He closed his eyes momentarily to cut the glare and to suffer in silence.

"What's the matter?" the major growled at him.

He shook his head. "Nothing. I've simply never seen anything like this layout on any planet in the whole system, and we've got some dillies."

Clete looked at him questioningly. "I thought you had never been over-space before."

Guy Thomas covered. "I've seen a good many Tri-Di travelogues."

The major said, "Come along."

They left Clete and Lysippe at the entry and together began to march down the extended hall, eyes supposedly front, although, all along the way, Guy couldn't resist shooting unbelieving glances left and right.

Could those pillars actually be solid gold? No, of course not. Ridiculous. They were probably simply covered with gold leaf.

Those lines of warriors. Holy Jumping Zen, all armed with scrambler rifles. There was enough fire power present to blow down the city.

Those mosaics over on the wall, the scenes of Amazons and what he assumed were Greek warriors, fighting in chariots. He didn't like the way the mosaics gleamed reflected light. Oh, *no*. The mosaics, the tiny colored pieces which composed the mural, simply couldn't be gems!

The hall could easily have accommodated an Earth-side football game. There was a self-conscious element in marching down its length. He had read once on one of the historical tapes, about the Italian dictator Mussolini who had an enormous office completely unfurnished except for the dictator's desk at the far corner. A visitor had to walk the full length of the office, becoming more self-conscious every step, to approach the other. It had

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been deliberate, and so, Guy Thomas decided, must this be.

All right, so he was impressed by the pomp and wealth of the Amazon Hippolyte.

At long last, they came to a halt.

On a dais sat a tall, distinguished looking woman in her late middle years. Her throne, a heavy wooden chair in which she sat, was simple. The only simple article of furniture or decoration in the whole layout, Guy realized. She was flanked, two to each side, by four other women in her same age group, though none quite so patrician. Their cuirasses were evidently of silver and richly embossed and inlaid with gems, one with emeralds, one with rubies, one with diamonds, one with sapphires. Probably, Guy decided, each Amazonian *phylon* had a symbolic color, a symbolic jewel. The Hippolyte's own cuirass was of simple gold without embellishments.

They stood there for a long moment, Guy thinking, *it's your ball, start bouncing it.*

The Hippolyte finally spoke, her rich, full voice in complete compatibility with her distinguished appearance.

"Present the Earthling," she said.

The major barked, "Citizen Guy Thomas, of Earth, representing the Department of Interplanetary Trade of the United Planets."

Guy bowed, moderately but sufficiently.

The Hippolyte said, "We understand you have come to . . ."

"Just a minute," the *phylon* chief to her immediate right said.

The Hippolyte turned to her, eyebrows up. "Yes, Marpesia? You have reason to interrupt me?"

The *phylon* chief nodded, without looking at her superior. Her eyes were narrow and on Guy Thomas.

"Only last year, when I was Amazonian Ambassador to the United Planets, he was pointed out to me at an Octagon reception. His name isn't Guy Thomas and he is not connected with the Department of Interplanetary Trade. His name is Ronald Bronston and he is top triggerman for Sidney Jakes of the notorious Section G of the Bureau of Investigation."

VIII

There must have been some sort of signal. Warriors, who had been standing far to the side, were approaching on the double.

Guy Thomas didn't bother to look for a possible way out. The legendary Houdini couldn't have escaped from this monstrous reception hall, throne room, or call it what you will. There must have been a thousand uniformed and armed women present.

He stood, unchanging, looking straight ahead.

The Hippolyte held her silence for a long moment. In less than that time, Guy and the major were flanked with a double score of

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young, efficient looking guards. The major, he noted, was glaring at him, speechlessly.

The Hippolyte said finally, "You have heard Marpesia's accusation. What is your answer, Earthling?"

Guy took a breath and said, "I am a citizen of United Planets and a resident of the planet Earth. I demand to be turned over to the UP Embassy."

The Hippolyte said, "Put him to the question."

He had a warrior at each arm. Less than gently, he was about faced and marched back to the entrance through which he had come only ten minutes or so earlier.

At the entry to the elevator, Clete and Lysippe stared at him but didn't move to join his retinue which consisted of Major Oreithyia and all the guards who could squeeze into the compartment. His two former guards from this distance could have heard little of what had developed.

He had no way of knowing what methods they had of interrogating him. Simple torture? He assumed that he could bear as much as the next man. But was their torture simple? There had been no hint in the Hippolyte's words to suggest of just what his interrogation would consist.

Would he have a chance to suicide?

He cursed himself for not having the foresight to provide himself with a capsule of cyanide. He also

cursed Sid Jakes for not having thought of it.

The elevator compartment sank and then, as before, shunted to the right, stopped, shunted left, stopped, seemed to twist and then moved forward at a clip.

No one, not even the major, said a word.

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His mind raced, but there was nowhere for it to go. Everything was out of his control. The merest movement and the hands on his arms tightened. Without doubt, some of them bore some type of stun gun. He had enough problems without being muffled by a tuned-down stun gun.

The moving compartment halted, shunted about again and then zoomed upward at a knee bending velocity. It came to a halt and the door opened.

They marched him down a corridor which had the odors and atmosphere of a hospital, rather than of a prison or military building.

They hustled him into a room which continued the hospital motif, up to and including an operating table.

"Wait a minute," he blurted inadvertently, even as two of his warrior guards reached down and grabbed him by the ankles. The two at his arms acted in unison and he found himself tossed up onto the table and held firmly.

He didn't see who it was that put the clamps on arms, legs and head. He was unable to move.

Someone blatted orders and all except a few seemed to leave the room. He stared at the ceiling, not bothering to turn his eyes in an attempt to see who was entering, who leaving.

He knew what was coming. There was to be no torture.

Shortly his suspicions were fulfilled. He felt a sudden prick in his arm. He clenched his teeth, knowing even as he did how meaningless the gesture was. There was another injection.

He might have known. In all other respects, the Amazonians had proven themselves to be as advanced as any of the member worlds of United Planets. There was no reason to believe they weren't thoroughly familiar with Scop, or its equivalent. He had no illusions. He had just received a shot of Scop and of some other drug as well.

There was a period of possibly five minutes in which various mutterings and shuffling went on in the background. He didn't bother to try to look. He kept his eyes on the ceiling.

Finally a voice said, "What is your name?"

Deep within him his soul screamed.

He said, "Ronald Bronston."

"What is your official position?"

"I am an operative of supervisor grade of Section G, of the Bureau of Investigation, Department of Justice, Commissariat of Interplanetary Affairs, of United Planets."

"Under whose orders are you working?"

"Sidney Jakes."

"What is his position?"

"Assistant to Ross Metaxa."

"Who is Ross Metaxa."

"Commissioner of Section G."

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"From whom does he take orders?"

"I do not know."

There was a pause for a moment and some whispering in the background.

Finally the voice came again. "What are you doing on Amazonia?"

"An Amazonian refugee requested aid of the Octagon. I was sent to investigate the situation on this planet."

"What was her name?"

Ronny Bronston remained silent. Within him there was ultimate despair but it was meaningless. He was fully conscious. He was in control of mind and body, save one thing.

In the background muttering and an air of disbelief.

A different voice said, "What was *his* name?"

"Sarpedon."

"What was his *genos* name?"

"I do not know."

"What do you mean, a refugee?"

"He fled Amazonia to request political asylum and to secure aid."

"What sort of aid?"

"Aid to overthrow the politico-economic system of Amazonia."

There was an unbelieving intake of breath in the background.

"What would take its place?"

"I do not know."

"Do you know anything about this projected new politico-economic system?"

"Yes, it would include men in the administration of the planet."

There was another short silence.

Finally a voice said, "Would it include women as well?"

"I do not know."

"Where is this Sarpedon now?"

"I do not know."

"Has he returned to Amazonia?"

"I do not know."

"Is he still on Earth?"

"I do not know."

"Do you know anything else about Sarpedon?"

"Yes, he is thought to be dead."

"Why?"

"He disappeared from the apartment which Section G had assigned him."

There was a long pause again. Finally still another voice said, "Does this Section G believe the Amazonian Embassy on Earth is guilty of Sarpedon's death?"

"Yes."

"How did Sarpedon get to Earth?"

"He was smuggled onto the artificial satellite that houses the UP Embassy, and from there returned by regular spaceship."

"Who smuggled him aboard?"

"The Sons of Liberty."

"The Sons of Liberty! Who in the name of the Goddess are the Sons of Liberty?"

"An underground organization of men."

"An underground organization of men! Don't be ridiculous."

That last had come from the background somewhere. It was not a voice Ronny had heard before.

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"Quiet," an authoritative speaker said.

The questioning continued. "What is the purpose of this underground organization?"

"To overthrow the present government."

"How?"

"I do not know."

"Do you know the names of any of the members?"

"Yes. Sarpedon, Zeke, Teucer, Damon."

"What are their *genos* names?"

"I do not know."

"Who is Zeke?"

Ronny Bronston remained silent.

"Where did you learn Zeke's name?"

"At the underground drop at Number 35 Heliopolis Street."

"How did you know this address?"

"It was given to me by Sarpedon."

"Did he give you any other addresses here on Amazonia?"

"No."

"When were you at the underground drop on Heliopolis Street?"

"Last night."

He could hear the major's voice in the background. "Artemis! He was under guard and in bed."

Somebody else snapped, "I assume you were the guard, Major Oreithyia? You realize it's impossible for him to lie."

"Silence," the authoritative voice rapped.

"Who else did you meet at the underground drop?"

"Teucer."

"Who is Teucer?"

"A Lybian refugee."

"Lybian refugee! What do you mean by Lybian refugee?"

"A man who fled Lybia and sought sanctuary in Paphlagonia."

"Sanctuary? Sanctuary with whom?"

"With the Paphlagonian Sons of Liberty."

Someone blurted, "Is there a Lybian Sons of Liberty?"

"Yes."

There was another lengthy silence and muttering in the further parts of the room.

Finally, "Who else did you meet at the Heliopolis address?"

"Nobody."

"Where did you meet Damon?"

He remained silent.

"How did you learn Damon's name?"

"Zeke told it to me."

"What did Zeke tell you about Damon?"

"He is the head of the Sons of Liberty."

"How many followers are there of this fantastic organization?"

"Tens of thousands of members and half the male population as inactive sympathizers."

"Ridiculous!" said the voice from the background which had been shushed before.

"Confound it, shut up, Penthesilea," the authoritative voice said.

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"Go back to this Section G organization, Hippo."

The original inquisitor's voice said, "What is Section G?"

"A department of the Bureau of Investigation of the Department of Justice."

"But what is its purpose?"

"To help overthrow the politico-economic systems of planets on which progress is being held up by restrictive governments."

There was a shocked hush. Someone muttered, "The rumors we heard were correct."

"But that is in direct conflict with Articles One and Two of the United Planets Charter."

Ronny Bronston said nothing.

"Were you sent to Amazonia to help the Sons of Liberty overthrow the present socioeconomic system."

"No."

"Why were you sent to Amazonia?"

"To investigate the situation and discover if the present socioeconomic system was holding up progress."

"Have you come to any conclusion?"

"Yes."

"What is it?"

"That the present socioeconomic system is holding up progress by preventing half the population from utilizing its full abilities."

"If you made this report, would Section G then take measures to subvert our government?"

"It is most probable."

"Are there any other Section G operatives on Amazonia?"

"It is improbable. If there were, I would most likely have been informed."

They squabbled some more in the background.

Finally the demanding voice came again. "Why does the Department of Justice concern itself with the internal affairs of member planets of United Planets?"

"It wishes to institute socioeconomic systems which will lead to the fastest progress of which the planet is capable."

"Progress in which sense?"

"Scientific progress, industrial progress, progress in education, in freeing the individual from any restriction that prevents him from realizing his abilities."

The voice had an impatient edge. "Why does the Department of Justice think it its business to force its version of progress upon sovereign member planets of UP?"

"It believes such progress is necessary to prepare the human race for its eventual confrontation with the aliens."

"WHAT ALIENS?"

"The intelligent aliens first discovered by the Space Forces over a century ago."

"Discovered *where*?"

"A space scout came upon a derelict one-place fighter which had obviously been crisped in an interplanetary fight. Its pilot was small but

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obviously intelligent. The craft was more sophisticated than any we are capable of building."

"Why were not the member planets immediately informed of this?"

"The UP heads decided that the human race must go into all out preparation for the eventual confrontation with the aliens. Even though the aliens be peaceful, the stronger the human race the better bargaining position it will be in, whatever the issues that arise upon our two life forms meeting."

The authoritative voice which had thus far done none of the questioning, said, "But why were the member planets not informed so that they could unite more strongly in the face of the mutual danger and thus progress together?"

"It was decided by the UP that a common danger does not necessarily unite the human race. The member planets include almost every race and color, socioeconomic system, religion and political governmental form that man has developed over the ages. Many of these, if not all, would reject progress if it threatened their institutions.

"For instance, a planet with a feudalistic social system would reject any attempts to have a system of free enterprise foisted upon it, no matter what such a change might mean in the way of progress. Another example is the early days of nuclear weapons on Earth. The whole world was faced with destruction, but that did not stop the rush toward war on the part of conflicting socioeconomic systems. Both sides would rather have pulled the whole race down, than give up its institutions. 'Better dead than red', was the slogan on one side, and the opposing side had slogans as strong or stronger. Mutual danger does not necessarily unite the race."

The voice said musingly, "Then the Department of Justice and its cloak-and-dagger arm, Section G, does not believe that Amazonia would necessarily give up its own institutions in the face of a common danger to the race."

It was not exactly a question. Ronny Bronston said nothing.

Somebody said, "We've already got more information than we need to bring this to the immediate attention of the Hippolyte."

The authoritative voice rapped, "Put this man under tight guard. Everyone present in this room is to consider herself bound by top priority security. Under no circumstances can anything revealed here be spread. Is that clear?"

There were murmurs of earnest assent.

Ronny felt himself being lifted, mattress, arm, leg and head clamps and all from the table onto a hospital operating room cart. He still stared at the ceiling, uncaringly.

He felt himself pushed through the door into the corridor. He could sense some warriors about him, but didn't care their number or where they were taking him.

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They were taking him to what seemed a very ordinary hospital room. He was lifted from the cart and placed on a bed.

"Should we undress him and put him under the sheets?" one of the guards said.

"Why?" another said impatiently. "This boy isn't going to do any sleeping for a good long while. If you ask me, the Hippolyte, the full council and half the scientists in Paphlagonia will be ripping over here within the half hour. Then they'll have our boy here stuck like a pin cushion with more Scop and Come-Along. He'll be lucky if they take time out in the next forty-eight hours to give him some nourishment."

"We shouldn't be talking in front of him."

"Why not?"

"Well, we shouldn't."

"He's not going to repeat anything to anybody."

"How do you know? Did you hear what Marpesia called him? The triggerman of Sidney Jakes. Maybe he doesn't look like much, but that Section G sounds like a rugged outfit and he's evidently one of their top troubleshooters."

"So what?"

"So we shouldn't talk in front of him. Someday he might get away from us, or be freed for one reason or the other."

The other snorted contempt of that opinion.

"Well, let's go out in the hall and talk. I'm bursting with all this. I've got to discuss it with somebody."

"Leave him here alone?"

"In the name of Artemis, what could possibly happen to him? He's got clamps an elephant couldn't break. Besides that, he's full of Come-Along and Scop, and neither will wear off for hours. He'll obey anybody's orders until the stuff wears off."

A face bent over him.

"Ronald Bronston, don't you move from this bed, understand?"

"Yes."

He heard the door open and close and assumed he was alone.

Not that it made any difference. Nothing made any difference. He had spilled enough of the inner workings of Section G and the ultimate purpose of United Planets to tear down the work of tens of thousands of dedicated men both before his day and his contemporaries.

There was small comfort in the fact that as yet they hadn't quite drained him of the secrets his mind held. For one thing, they'd got an inadequate picture of the threat of the aliens. They hadn't asked enough questions to bring out all the ramifications. However, there was no reason to believe that in the immediate future he wouldn't spill every bean.

He had no doubts whatsoever that within days Amazonia would broadcast his revelations. That every member planet in the confederation

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which feared interference with its institutions would drop away from United Planets. The work of centuries would be ended within weeks. And all because of Ronald Bronston.

He cursed the fact that he and Sid Jakes had ever attended that Octagon reception. They should have known better. It was a tradition of Section G to avoid the public eye.

He heard a door open. Evidently, one of his guards returning, just to check. What was there to check? He couldn't move a muscle and even had he been able to, he had been given orders to remain in this bed, and it was impossible to disobey.

He heard footsteps approaching him across the room, and frowned that they seemed to be stealthy.

A face looked down into his. A face that was grinning amusement.

She spoke in whisper. "Cutie, I hear you've got yourself into some sort of trouble."

It was Minythyia. How had she got into the room?

She began fussing with his bonds, muttering, "How'd you get into this mess?"

"One of the Hippolyte's council recognized me," Ronny said.

She looked up and shot a puzzled glance at him, even as she worked, as though wondering at the Zombi-like inflection of his voice.

"You're under Scop, aren't you?"

"Yes."

"Oh, oh. I'm probably getting myself into trouble. Clete didn't know what it was you had supposedly done. You got anything else in you? Or do you know?"

"Yes."

"What?"

"Come-Along."

"So! Well, that makes things easier. Get up out of that bed, Cutie.'

Her order countermanded the one the guard had given him. He arose and looked at her.

Minythyia said, "You look awful with that stuff in you. We've got to get out of here. Follow me."

He followed her, noting that there were two doors to the room. He assumed that through one his guards had passed into the hospital corridor. In fact, he indistinctly could hear their voices.

He followed her through the other door. There was another hospital room, this one empty, on the other side. She hurried through this, he immediately behind. She grasped the knob of the door on the far side of the room and opened it. The room beyond was occupied by an elderly person, in bed.

Minythyia said apologetically, "Sorry to bother you again. That nardy door is still locked and this is the only way to get through."

The patient in the bed murmured something indistinctly.

They passed through the door beyond that room, too, and Ronny Bronston found himself, still following the Amazon warrior, in a cor-

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ridor. It came to him suddenly that his rescuer, if that was her role, was not garbed in usual regular uniform. In fact, her dress differed little from his own. A flowing, tunic-like affair that presented her admittedly curvaceous body to much better effect than had the military outfit which tended to suppress breast and hips.

They hurried along the deserted corridor which opened in turn to still another. It was larger and Minythyia slowed her pace, as must needs he as well since her order had been to *follow me.*

They passed various persons, undoubtedly hospital personnel and a few who were obviously either patients or visitors. Ronny and his rescuer passed unnoticed.

They left the building through a side entrance and again increased their pace. Minythyia hustled down a stone walk to a sports model hovercar parked in a forbidden zone, going by the signs imbedded in the street.

She vaulted over the side into the driver's seat, snapping, "Get in! Artemis! Hurry!"

He climbed in on the passenger's side, hardly in time to avoid being thrown aside by the vehicle's surge forward. They were down an alley, out onto a monstrously large curving driveway, then out into a broad boulevard to be absorbed by the traffic.

Ronny noted that she was driving manually and realized why. Had she switched to the less dangerous auto, the traffic computers handling the car would have been able to pinpoint her. He didn't know exactly what was happening, but if it was known, or came out, that Minythyia was his kidnapper from authority, then the hunt would be on in earnest.

She shot a grin over at him. "Clete didn't know what sort of romp you tried to pull off. Only that you were marched away for questioning. Something really criminal?"

"No," he said.

She chuckled abruptly. "It occurs to me that I'll never have another chance like this. Listen, boy, do you think I'm attractive?"

"Yes."

"Back on Earth. Would you have gone for someone like me?"

"Yes."

She laughed, a trifle wryly. "Would you . . . would you have wanted to . . . marry me?"

"No."

"Um-m-m. That puts me in my place." She laughed again. "And how do you like our fair city?"

"I like it."

They were hurrying down a main artery. Traffic was heavy, though not as bad as many another capital city Ronny had been in in his time. As he had noted when seeking out Zeke and the Sons of Liberty, the public buildings, squares, fountains, and monuments were unrivaled.

Minythyia seemed to be on some-

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thing like a talking jag, brought about possibly by nervousness. Perhaps it was just coming home to her how very serious a matter her romp was.

She said, "See that building there? Apartment for bachelor girls. That's where your pal Patricia O'Gara has been put up." She chuckled. "She's had to go back to school. She *thought* she knew all about Amazonia, but she didn't."

She pulled off onto a side street and cut speed somewhat through necessity. The little sporthover responded to her faintest touch on the joystick.

She swung it hard to the right again and dropped her brake lever.

"Here we are!" she chuckled. "Come on, boy."

She vaulted from the car, bustled around to his side as though to open the door for him, but by the time she had arrived he was standing on the walk. She led the way toward a large, heavy wooden door, beautifully carved. It opened before her and they hurried through.

"We're on the third floor," she said. "No elevator. Elevators are masculine. Exercise is good for you. Come on, Cutie."

They ascended the marble stairs.

At the top, she utilized a key and they passed into a moderately large apartment. Ronny looked around. It was surprisingly well done, the taste excellent. For once, the decorative motif had nothing to do with Amazons or Greeks. The murals and paintings were based on nature studies. The main room, in which they stood, was large and comfortably done with chairs, coffee tables and couches. There was what must be a small bar to one end of the room. It looked to Ronny Bronston considerably more like a bachelor's apartment than the one that had been assigned to him in the sanctuary.

He stood in the middle of the room, waiting further instructions. Without instructions, he knew, he was free to act on his own; however, he had little doubt but that Minythyia was going to keep him well in hand so long as the Come-Along and Scop controlled him.

She approached him now, grinning mockingly. "So," she said, "at long last. I don't know what there is about you, Cutie, possibly the romantic aspects of you being from over-space."

Her smile turned more mocking still and she put her right hand on his shoulder.

"I thee take," she said softly.

TO BE CONCLUDED

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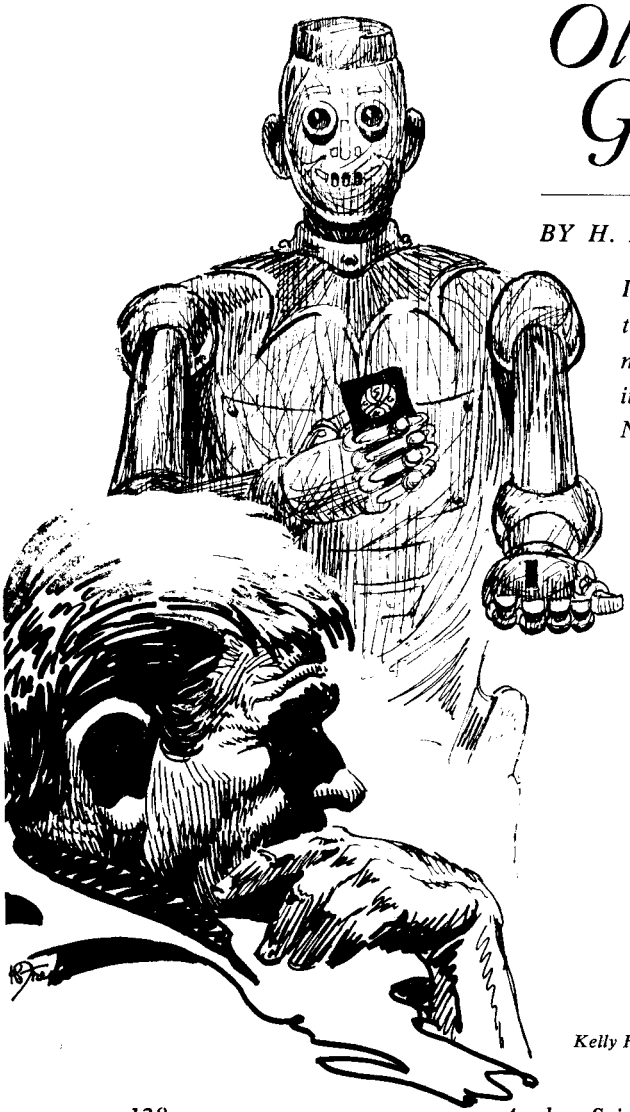
The Old Shill Game

BY H. B. FYFE

It has been legally decided that, since an animal has no moral sense, it is incapable of crime. Now a robot . . .



Kelly Freas

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Vendor Number Twelve stood silent and motionless on its small foot wheels, barely living on a stand-by current while Joe Olson extracted tapes of the previous day's sales.

The shortish, spare man brushed a wisp of faded blond hair from his eyes, then gnawed a thumbnail as he studied the totals. Grimacing guiltily, he paused to open a chest hatch and remove a square of flavored gum.

The business of unwrapping this provided a moment for consideration. He swung the hatch wider to examine the various small packets remaining. Finding that the stock more or less checked with the records, indicating no malfunction, he chomped disgustedly on his gum and peered along the narrow shop. The robovendor stared stolidly ahead.

"Neil!" called the man. "Come over here an' look at old 'Dozen' a minute, hey! We gotta think of a new line for 'im, or maybe a new beat."

From the end of a row of twenty-odd machines, where he had been tinkering with a newer vendor, Neil Dyer looked back. A beefy youth with close-cropped reddish hair, he amiably tucked his wrench into a breast pocket of his coveralls. These, to match the vendors, were sky-blue with maroon trim. The robots were much cleaner.

"What now, Joe?" he demanded, strolling along the line. Large white teeth gleamed amid a spatter of freckles. "Somebody jimmy the coin stack?"

"Of what?" groaned Olson. "There's hardly anythin' to steal. Makin' a lousy dime gets tougher an' tougher!"

"Nobody's even minted a dime for years and years. With nico-gum, shoe zippers and Relaxies a buck apiece, we're lucky they coin a two-centimeter dollar."

"I know, Neil, I know. It's just an old sayin'."

"It must be our fault if he isn't selling. Old Dozen can't actually think, after all—he just goes where we send him."

The robovendor suffered this lukewarm defense in silence except for the nearly inaudible hum that indicated he was recharged and ready for business.

"Yeah . . . there must be some way—"

They glanced back as a door opened fifteen feet behind Olson. A trim little brunette, her shimmering raincape fluttering about her, charged in from the hall toward the tiny, plastic-enclosed office at the rear of the shop.

" 'Morning, Boss . . . Neil!"

"Hello, Dora," answered Olson. He examined his watch.

"Ninety seconds," he predicted.

"Till she sheds her cape and that thing that's meant to be a hat," agreed Neil.

They waited patiently. In just under two minutes, Dora stamped out of the office. Being short, she fa-

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vored heels of a height that made her stride do a lot for the snug azure business slacks and blouse she wore.

"Neil!" she cried. "You didn't leave the tapes again! How can I keep the books up and order new stock if you don't—"

"Right away, Dora! They're on the way," promised Olson, prodding Neil.

They hastily snatched out the sales records of machines not serviced the previous evening and stacked them in Dora's outstretched hands.

Neil watched fondly as she pounded back into the office. Then, returning to the matter at hand, he raised his fingers to the light to check for traces of oil.

"Well, if it's merchandising, it's your baby," he said. "I'm just the robotech here. You tell me what you want him to do, and I'll work out the circuits."

"Now, Neil! Two heads . . . an' all that! I know you boys have a great union, an' you draw compensation of eighty percent durin' layoffs . . ."

"Which usually aren't long."

" . . . But ain't it more interestin' to make the other twenty percent by outthinkin' the competition?"

"Naw . . . it's more interesting to make it by doping out a new program."

Olson shrugged and gave it up.

Neil regarded him with amiable sympathy. He said, "You know, no matter how we set these vendors, the real problem is having too many against us. We have Dozen working the Mars Avenue Concourse between the monorails and the subway. How many other robovendors are on the same beat?"

"Too damn' many!" growled Olson. "Five or six other companies go in there. A poor human runnin' between escalators don't know which one to . . . *Hey!*"

He stared silently at the blank wall.

From the office echoed the subdued clacking of an automatic typewriter reproducing a list of items Dora was dictating into its microphone.

Olson continued to gaze past Dozen's head. The robot, still switched to "inactive," stared glassily back at him with its pseudo-human face mask presenting a permanent, polite little smile.

"You had an idea—I heard your top gears shift to *power,*" Neil grinned. "What now? Ads on their backs again? Free commercials with the musitapes?"

"No, no . . . wait a minute!" Olson glanced down the line of vendors awaiting servicing and reloading. "What draws people faster than anythin' else?"

"A cute blond model with no—Oh, all right . . . what?"

"Other people. A crowd. Right? You ever see it start on the street or a busy subway concourse? Somebody drops a dollar coin, the fellow with 'im stoops to help look, another

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walks into him an' yells, an' pretty soon you got twenty stretchin' their necks to see what's goin' on."

Neil scratched his freckled nose gently and waited.

"So here in the shop we got a ready-made crowd . . . if you could just program them right. Real cloaks an' hats for the humanoid models. Then have 'em line up to buy paper combs an' nico-gum!"

Neil's reddish eyebrows crept upward. His toothy grin began to dawn.

"*Shills!*" he exclaimed. "That's what they used to call *people* who worked that trick. Why not? Let's try it and see how it works!"

Still early that day, Dozen invaded the Mars Avenue subway complex to begin his vending beat. The main crowds of the morning had not yet coagulated into the usual frenzied mass, but a constant trickle of human traffic flowed there at any hour of the twenty-four. Later, when the monorails and helicopters delivered waves of commuters, the broad passage would become a bottleneck.

At the moment, however, the average human on the scene plodded along in too subdued a mood to admire the cheerfully luminous ceiling or the beautiful mosaics of street scenes between the posters. He was a poor prospect for nicotine gum, news tapes, or notions. Following arrows on the plastic flooring was enough.

Dozen rolled slowly along one wall of the concourse, facing the walkers enroute from an express subway station to the escalators, elevators, and moving walkways that would bear them to other subways, sub-surface building entrances, or even to an open street, or heliport far above.

He unfurled a sign over his chest to announce song tapes at special prices. Presently, a human paused to study the list. Dozen halted politely.

"Musitapes—'Space Song' and 'Deep as Love'!" said the customer.

Dozen extended his left hand, registered the fact that two-dollar coins had been inserted into the palm-slot, and internally released a pair of foil packets containing the self-playing tapes. These slid out of a small hatch where his navel might have been and onto a projection meant to resemble a serving tray. The hatch snapped shut like a camera shutter. The man scooped up the tapes and departed.

Several minutes later, a petite girl stopped him with an order for a pair of stockings. Dozen's built-in procedures caused him to inquire the size *after* the ten-dollar "eagle" had activated his circuits. He next took in a dollar for nico-gum. A small man stopped him for a miniature glue-stick, the standard repair for a paper shirt. Then there was a lull until a larger man bought two musitapes.

Dozen was no thinker, but this

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last gentleman registered upon his scanners with exactly the same pattern as his first customer of the morning.

In a short while, he detected another duplication, the small girl. This time, she purchased a lip brush loaded with "Aldabaran Red." The slight man who had been the fourth customer registered his pattern again. The first pattern returned for a sports newstape. A human not in the series was sold a packet of *Zooms* because Dozen's scanners defined him as an adult. The tape man came back.

This time, the shorter man and the girl accompanied him, and he reached for a covered switch on Dozen's shoulder.

"That'll be enough, Boy," he said. "We'll go home now."

Dozen's urge to vend damped out. He pivoted and followed the human as directed.

"Watch it!" objected the smaller man as they approached an escalator. "That's for humans only. We gotta take 'im in a freight elevator."

"Aw, the cops are mostly robots, too."

"Not the sergeant in charge of the concourse. It'd be just my luck to get a restriction slapped on our vendin' license!"

"He worries too much, Dora," said the large man cheerfully.

Nevertheless, he led the way to an elevator. Dozen followed, listened stolidly as the humans gave a level number to that machine, and trailed them out of the car when it stopped. A moving walkway eventually deposited them at a corridor leading to the inner door of the shop.

Dozen was halted just inside. The large man switched him to "inactive."

"Don't know why you quit so soon, Joe," he complained. "Sure—there wasn't much life in folks at this hour, but a few took the bait."

"Maybe it'ud work, Neil. Maybe they were already watchin' for a vendor. Anyways, we can't all three of us go scootin' around from vendor to vendor. We'd wear our feet to the ankle bones!"

"Mine feel that way already," announced Dora. "Do you mind if I go back to the books and shift my weight?"

"Go ahead," said Olson, "but first look up some costume shops and see where we can rent some cloaks an' hats. We might as well try it for real."

"I'll get the main crew rolling," said Neil, thoughtfully observing Dora's retreat, "and then see what I can work out."

He moved down the line, switching on restocked machines and dispatching them directly onto the concourse through the large door at his end of the shop . . .

At about the same time the following morning, with a somewhat altered ego, Dozen rolled along the concourse. Now, when a figure stopped to scan the list of musitapes,

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he scanned back in a more sophisticated manner than heretofore. Neil had programmed him to know a robot from a human in spite of a flexible face mask and human clothing.

Therefore, when the robovendor electronically "felt" two one-dollar coins click into his palm, he dropped into his tray foil envelopes of dummy tapes.

A passerby glanced fleetingly at the little wheels detectable beneath the soles of the "customer's" shoes, but another figure had already replaced the patron.

Again, Dozen detected metal. He "sold" a square of fake nico-gum.

The third robot-shill was forestalled by a legitimate human, who apparently had been reminded by sight of the previous transactions that he had left home in a disheveled state. Dozen sold him a legitimate hard-paper comb, and scanned two competing robovendors who stood unheeded in the vicinity.

A flurry of commuters swirled past—cloaks flying and sandals squeaking on the plastic walkway—and left a momentary lull. Dozen moved a few yards toward the nearest escalator, placing himself well ahead of the other vendors.

Choosing a spot where a handsome mural of a park many levels above had been permitted to peep between advertising posters, but some distance from the possible distraction of a primitive, immobile coffee server mounted inside the wall, he broadcast the *"beep"* that sent his assigned robot shills into their program.

This time, he worked them through it twice before a passing human proved suggestible, but the first real customer was followed by four more. Dozen retailed notions, sportapes, and nico-gum—always a good seller in the subways, though requiring a quick scan for childish outlines before the sale—as fast as he could accept coins through the slot in his left hand.

The flow of human traffic presently changed. Instead of little groups spurting past, a swelling tide flowed from the express and monorail exits.

Other robovendors arrived by various routes. Some, wastefully programmed to travel from out-of-the-way shops, appeared from the direction of the local subways. A few descended from street level via escalators, and one was electronically ticketed by a robocop for getting in the way of humans. A good many stationary shoe shiners and servers of food or drink merely slid open wall panels and lit up.

Dozen paid no attention to these last. They were immobile installations with no semblance of human form except for representations of faces flaunting what their proprietors fondly hoped would look like jolly expressions.

The humanoids, however—the movers, the competitors—*they* attracted his attention. One of his scanning devices took note of every

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one that approached within a fifty-foot radius, and Dozen automatically moved to place himself between the newcomer and fresh prospects. He was programmed to compete, too.

"Hey!" exclaimed one of a pair of huffing customers who had paused in their rush toward an escalator. "Who . . . what's that in line—another robot?"

Neil had foreseen that contingency despite the human suits, cloaks and hats obtained by Dora. Dozen beamed another signal to his shills, who immediately decamped. He activated his voice tape, selected an appropriate phrase to forestall loss of a sale, and inquired, "What is your desire, sir?"

"Pen refill, purple, an' a three-pack o' nico-gum!" ordered the patron, gazing after the retreating robots in a vain effort to detect whether their humanly striding feet were actually rolling on small wheels.

The crowd was too thick. As he craned, he missed Dozen's left hand with his coin. It rattled down the robovendor's casing toward the trampled floor.

The vendor scanned it all the way down. At the correct instant, he projected metal-mesh net from his shin. His motors hummed as the net positioned the coin magnetically and neatly flipped it upward into his waiting palm. Only then did his built-in instructions permit him to discharge the desired products and the correct change. The customer clawed up his purchases almost before the vendor's right hand had deposited the change on the tray. As he rushed off, glaring at his watch, another took his place.

When the flurry had ended with a tall girl who bought a two-second spray of *Sublime Orgy,* Dozen's cheaper scent, he moved onward. His scanners had detected several competitors gradually converging upon his active location.

For two hours, the peak of the rush, Dozen more or less repeated the sequence. He opened fresh territory with the precedent of his shills, sold all he could before the opposition caught up, then moved to another spot.

Olson was amazed when he returned to the shop for restocking well before noon.

"Dora!" he yelled. "What else have we got that we could push?"

"Hold on!" objected Neil as the petite bookkeeper bustled out of the office. "There are just so many cubic centimeters inside that casing. We've already got him selling paper combs, shoe zippers, musitapes, sportapes, cosmetics, perfume, *Relaxies* and *Zooms,* nico-gum for those that don't smoke and cough-gum for those who do, ball points for pens, glue-sticks for shirts—"

"All right, Neil, *all right!* Without you addin' that bulge in back that's just inside the regs on humanoid shape, we wouldn't get in as much as we do. Maybe add a few of them

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Skin-Wate girdles in the little tube . . . this is a big change for us!"

"Well . . . uh . . ."

"Well, ain't it?"

"Pretty soon," Neil said slowly, "the other boys will smell something wrong. Somebody will catch on. That's the day we should plan for."

"So then it'll be all even again. Meanwhile, we beat their brains out!"

"Maybe not quite even. Let me think about it a little more. What we'll have to do is set Dozen up ahead of time to handle the competition."

"The other robovendors?"

"Yeah. Uh . . . if you were running those outfits, and caught on to what we're doing . . . well, what would you try first?"

Olson frowned at his sandals. He wagged his head thoughtfully.

"Block him some way. Set a few machines to crowd him aside?"

"They'd take up your license for that!"

"Yeah. So I'd put out shills of my own . . . lessee . . . an' some to jam the line by Dozen so no humans could buy from 'im. I'd sell the stuff later myself."

"*If* it were salable."

Olson began to grin.

"Dora!" he called. "Dora, how many gallons we stuck with of that rotten perfume? The *Corona Cloud?*"

"Plenty!" said the girl, appearing at the door of her cubbyhole. "I *told* you not to buy that essence de skunk, but you said it was cheap—"

"We'll sell it yet! Listen, Neil—can you fix him so if a robot comes up that ain't ours, it gets a squirt in its scanner, no matter what it pays for?"

Dora wandered over as Neil nodded slowly, a speculative glaze in his eyes.

"Just make sure he doesn't have an accident around here!" she warned.

Neil flashed his big white teeth, then shrugged away whatever vision had crossed his mind. He left the girl reminding Olson of other clinkers in the inventory and strolled toward the far end of the shop, fumbling through his coveralls for paper and ballpoint as he went.

As it turned out, the additional profits flowed for more than two weeks before Olson, on one of his hurried inspection trips, recognized a rival proprietor and two of his staff loitering on the concourse.

Not only were the three observing Dozen with intent hostility, but one was also making notes, as if counting and classifying the vendor's customers.

"Any day now!" he warned Neil upon returning to the shop.

"I'm about ready," said the robotech. "I've stuffed in a bellyful of new procedure tapes and enough printed circuits to play poker with."

"Switch them in tomorrow, an' he can handle them, huh?"

"I think so. In fact, I'm working on the next step: what can he do

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with all the extra weight of coinage he'll take in? I think he should be set to unload it somewhere, without taking time to come back here to the concourse limit."

"He can always go to a change booth," suggested Olson airily.

Neil smirked.

"Confidentially, *our* vendors are already set to do that when they run out of change. Trouble is we can't make the robochangers *take* dollars and *give* hundreds."

"Oh," said Olson. He scratched his head and added, "Maybe I oughta open another account at the bank. Well, think about it while I check the receipts!"

He wore the look of a man reveling in the unaccustomed luxury of putting such trivialities out of mind while he labored to comprehend the extent of his affluence. The cure of the difficulty was up to Neil.

The actual effecting of the program lay with Dozen a few days later. By then, Olson's rivals had begun to strike back.

The robovendor, laden with large coins but only half sold out because of heavy patronage by certain nonhuman shoppers, was moved by various nuances of internal balance to home upon a robochanger.

To a human, it might have appeared that the opposition shills had been programmed to present eagles and even hundreds in payment for minor purchases. Mostly set to demand one unimaginative item—nico-gum and *Zooms* being most popular—they had by now become so fragrant that humans pointedly avoided them.

Their combined efforts, however, had an effect. The relative weights of coin columns within Dozen's arms warned that he was overloaded with eagles and silver hundreds, but short of copper fives, dollars, and half-dollars.

His scanners automatically oriented him according to certain landmarks of the concourse. Pivoting on his small foot-wheels, he rolled toward a point in the broad walkway opposite a subway escalator.

He had to brake several times to permit humans to cross his path. Once, he was halted by an individual on whom other humans might have detected evidence of a hangover. To him Dozen sold a packet of *Zooms*.

At length, he reached his goal: a square booth of stainless steel about seven feet high. Large yellow letters glowed above the panel he approached, proclaiming, "Change!"

At about the center of the panel, above a small opening, a number of lenses stared out. Some designer afflicted with a bad case of the cutes had incorporated them—as eyes and other features—into a simpering face enameled on the panel. Beneath the "chin" was a counter recess about a foot high, the same deep, and two feet wide with a trough-like shelf projecting from the bottom.

Three humans were in line there

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as Dozen rolled to a stop. The first scooped up several coins and hurried off. The next tossed a ten-dollar eagle into the opening. A light flashed briefly, the coin was tilted into the bowels of the mechanism by the flick of a little trapdoor, and a quantity of smaller coins rattled into the trough from a chute at the left.

Dozen waited until the humans had obtained change for their fares, moved aside for another who arrived behind him, then confronted the panel.

As if making change, he released an eagle from his right hand. It was engorged with a blink of light. Down the chute poured eight dollars and four half-dollars. With a meticulous clumsiness that hinted of shop-improvised alterations, he flipped the coins one-by-one into his left palm.

At the fifth such transaction, the robochanger hesitated noticeably. The seventh time, it rattled another eagle back at him. A screen lit where a mouth belonged in the picture. In glowing red letters, it proclaimed, "No change!"

Dozen withdrew and circled around to the adjacent face of the booth, which flaunted the same simpering expression. He put down an eagle.

This panel obediently began to eject the customary eight-and-four, until some internal connection made good after the fourth operation. Then, it scanned him, buzzed and clicked irritably, and flashed another sign.

"A maximum of one hundred dollars is required to be changed."

Dozen patiently wheeled away to approach the rear of the booth, where he was confronted by an identical smile and array of lenses. Here, he changed two more eagles before provoking the statement, "Service for patrons only!"

Dozen backed off, scanning the surrounding concourse. His shills waited a short distance away and a few humans were passing, but there seemed no direct cause for the changer to warn him out of the way of possible human patrons. He rolled up to the fourth face and clinked down a hundred.

Ten eagles slid down the chute. Something about the silence that ensued definitely suggested a suspension of operations. The sign here flashed, "You are cautioned against illegal transactions!"

Accepting the officialese as normal, Dozen rolled away on a fifty-foot radius, scanning an approaching robocop as he did so. He succeeded in placing the booth between them by the time the next human stopped for change. The man obtained his coins and walked off, doggedly trailed by the robocop.

Dozen returned to his vending . . .

During the following week, Neil Dyer ran the number of vendor-and-shill teams in action up to five. Olson began to speculate aloud

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about buying more machines. Although the sales of each team tapered off after an initial peak, as his rivals discovered them, his profits climbed higher and higher.

Neil took to trying new ideas on Dozen as a matter of course. He felt somehow that he did better when building upon his first success. Some tricks that worked immediately with Dozen failed in other machines, or required several bouts of trial and error adjustments.

"It's funny," he told Olson one day, "how often we dream up the latest wrinkle from something he does or needs to be able to do."

"Ah, if I had a hundred like him!" murmured Olson. "Well, now, how you gonna set him to use that new account I opened?"

"Here's the identity card," said Neil, returning to practical matters. "I bonded it to a magnetized metal plate that will clamp itself to his chest. Back plain—it'll look like a patch. When the banking window speaks, he'll reach up for this."

"Shows the scanners the number, an' we get credited with the deposit?"

"Right. He'll hold out his right hand, one of the places where his serial number shows. I just added a variation to the standard response to a demand for identification, only now the card number will show instead."

"Great!" chuckled Olson. "Now he'll be operating all the time he's out. He'll sell, get change when he needs it, deposit the receipts—Neil, you got him so close to thinkin' that we hardly have to come to the shop at all!"

It was almost true, except for loading stock into the vendor's casings.

Dozen continued to attract a number of customers by the suggestive use of his shills, and he usually kept a few minutes ahead of the competition. Sometimes, the shills "happened" to get in the way of other vendors. Most of the imitations now invading the concourse were outmatched. One day, Dozen permitted one of them to purchase ten shots of rank perfume in a row.

Having fleeced the poor machine to the limit of its cash, he rolled away that much richer. Something inside him performed a sort of calculation which in a human might have been termed an analysis . . . an estimate . . . a guess.

He must do something about his internal imbalance: he could stop at a robochanger . . . he could stop at a banking window . . . the nearest banking window was closer than the nearest robochanger.

He zigzagged through the crowd to a wall of the concourse, along which he led his shills until he reached the banking window. This was situated between a cheery coffee panel and a mosaic of soaring buildings behind which the stars seemed to shift with the viewer's approach.

"May I help you?" inquired a

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friendly voice as the window recess lit up.

Dozen removed from his chest the magnetic tag with the number of Olson's account, identifiable from any window of the bank that served the concourse, and presented it to the scanner for the necessary split-second. He reversed the motion and it became again a patch on his casing.

The amenities concluded, he extended both hands and poured coins onto the counter. The banking window ingested them with efficient rapidity, informed him the sum was already credited to his account, and invited him to call again.

Having handled the first item, Dozen set out to find a robochanger booth. He was now completely empty of coins, a minor problem with his new sophistication.

At the first panel, he broadcast the inaudible *beep* used to control his shills. As he had learned recently, it operated more or less the same with a robochanger. Coins rattled down the chute. Dozen swept them into his palm slot. More slid down . . . and more . . . and more.

Red letters flashed rapidly from one pre-taped sign to another as Dozen gained weight at the changer's expense. Finally, the cascade of coins ran dry and the admission, "Out of order!" flashed on.

Dozen moved to the next panel.

This jolly face could no more withstand him than the first. Somewhere inside, however, a humble, little-used protective circuit took action. As Dozen rolled around to the third panel, he was confronted by a robocop which had just arrived.

The minion of the law flashed a signal which, could it have been slowed down and translated into distinct bits, would have been understood by a human in terms of an order to cease and desist from trespassing upon the human prerogative of patronizing a change booth.

It further instructed him to produce identification and added that his number would be recorded at the central files. Notice of the fine, payable in ten days, would be forwarded to his owner.

Dozen detached the metal patch from his chest and presented it to the robocop's scanners. The ordinary procedure was for the cop to scan the serial number from his hand and beam a signal instructing the robot to lower the hand again. In the present instance, lowering the hand as ordered resulted in the magnetic tag attaching itself to Dozen's leg as the hand came down.

The final instruction was the robotical equivalent of the age-old order, "And now get the hell out of here!"

Dozen rolled away. His shills picked up his trail. The robocop headed toward a disturbance in the opposite direction . . . and the change booth remained unhappily in place, buzzing and clicking sulk-

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ily as it counted and recounted its sums but failed to balance.

At the first banking window along the wall, roughly opposite the one he had last patronized, Dozen was greeted by the same friendly voice. He tapped his chest and presented his empty hand to the winking light before depositing all the coins wrung from the robochanger. The organ of commerce recorded his serial number and accepted the money.

Having completed that business, Dozen left to transact more.

After another hour, he had disposed of the bulk of his stock and was headed home. About then, his sensors took note that his route was being dogged by a dark green vendor.

Dozen paused to analyze their relative positions in respect to the density of potential customers. An ill-clothed figure headed for the other vendor.

Olson's machine scanned the imitation human approaching his competitor. His own programming urged him to roll between them to intercept the "purchaser."

"Nico-gum!" ordered the voice tape of the thing facing him.

Dozen extended his left palm. It was crossed by a coin from the right hand of the disguised robot. As soon as the metal registered inside his arm, Dozen released a squirt of *Corona Cloud.*

The shill hesitated, not because of the perfume but because the pattern it scanned was not that of the dark green vendor from its own shop. Dozen beamed the supersonic *beep* that urged it to action. It transferred another coin to him and instantly received another baptism of *Corona Cloud.*

The green vendor inquired, "What is your desire, sir?" and tried to roll around Dozen's left side.

Olson's vendor edged slightly to the left, emitted another *beep,* collected another coin, and spat in the shill's face yet again.

The green robovendor tried the right flank, but was smoothly blocked in that direction, too. Meanwhile, a stream of coins flowed in a silvery blur from the shill to Dozen and the surrounding air took on the aroma of a swamp in bloom.

"What is your desire, sir?" insisted the green vendor.

Dozen engorged the last of the shill's coins and turned upon its leader.

Beep!

The green one extended its change hand and slipped a coin into Dozen's left palm. It suffered a squirt of *Corona Cloud.*

Beep! Beep! Beep!

The green vendor produced coins faster and faster. Each tribute purchased another snappy jet of perfume. Another *beep* . . . another coin . . . another squirt . . .

By the time Dozen ran out of *Corona Cloud,* an area for fifty feet

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around the three robots had become and remained completely clear of humans. By the time the green vendor ran out of money, Dozen was loaded beyond Olson's wildest hopes. His motors labored audibly as he rolled off, scanning about for a banking window.

The green robovendor held its territory for some little time thereafter, querulously demanding, "What is your desire, sir?" Its shill retained enough of its programming in an unshocked state to repeat the gesture of proffering a coin, and the vendor continued to meet the hand with his own left palm.

Since neither money nor stock changed hands, a passing hobbyist was moved to haul out a pocket camera and shoot six inches of minitape, with which he conclusively proved that evening that robots could argue among themselves.

Finally, the vendor rolled away, on whatever route would lead it back to its own shop for restocking. The shill experienced trouble in following when its drive wheels slipped in the puddle of *Corona Cloud* that had trickled down its casing.

Discreetly followed by his shill team, Dozen headed in the general direction of home base. At the next banking window he passed, he paused to deposit the fruits of his latest extortions. Then, reacting to the condition of being without stock of any kind, he continued on his return journey.

Occasionally, a competing robovendor crossed his path, and it was now an automatic reaction for Dozen to *beep* it into standing and delivering.

The fourth time this occurred, an uproar ensued.

A short, round, very red-faced human dropped his cup beside a coffee server and charged across the concourse, shouting expressions that for the most part did not register in Dozen's memory bank. Some resembled a cease-and-desist command. There was also an implication of extensive repair, or perhaps total dismantling.

One loudly repeated phrase, echoing along the concourse, produced the sound of a politely modulated siren: a robocop on the way at full speed.

Dozen headed for the far side of the concourse. The round man scuttled into his path, forcing him to turn away, whereupon he bumped into the vendor he had just halted. Dozen maneuvered around that machine but came mask-to-face with the human again. The bellowing man, even redder, jiggled up and down in a frenzy. The siren sounded very close. Other humans were turning to stare.

Dozen wheeled away and beamed a full-power *beep* at the other vendor.

A shower of coins rained from that machine's palms to clink upon the plastic floor and roll in all directions. One or two humans stooped to retrieve them.

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"What is the complaint here?" inquired the robocop, braking to an abrupt stop barely in time to avoid butting the broad posterior of one stooper.

The red-faced man began to shout at it. Dozen signaled his shills and made for an escalator. About two dozen humans were now scrambling after the spinning coins. The robocop swung from one to another, demanding to hear a complaint.

Dozen rolled onto the escalator with his shills behind him. The last scan he directed to the rear revealed the robocop completely entangled in a crowd of jostling humans. The red-faced man had both arms wrapped around his robovendor, which he seemed to be trying to drag from the melee.

Reaching the lower level, Dozen and each of his retinue were electronically ticketed by another robocop for riding a human escalator. Immediately upon release, he resumed the journey, and went as far as possible before the detection of certain programmed landmarks caused him to chance using an "up" escalator. Something seemed to have jarred his setting; he molested no more vendors on the way.

It was only a few days later that Olson showed Neil an advertisement. The robotech was servicing number Twenty, a specialty vendor that dealt profitably in sympathy tapes. Perhaps it was the vast impersonality of the city that made so many people seek cheering up via an understanding, intimate voice which soothingly assured them that their true worth was not appreciated, that they were much better than they realized, that tomorrow might be their big day . . . and so on.

Neil had just sampled one of the self-playing tapes as a spot check. It had driven him to valve a mug of sudsy liquid from a two-foot cubical contraption he kept mounted on the wall.

He sang softly to himself:

"Oh, Dozen helps Neil in the workshop,
Brewing the synthetic beer—
Twenty sells love for a dollar,
Oh, Lord, we'll get rich around here!"

"Hah!" grunted Olson, walking up. "We are already. Draw me one, too!"

Neil obliged. Olson took his beer and waved some papers at the other.

"Dunno how, but Dora's figures say we take in even more than we thought. I ain't complainin', but it don't add up."

"I have the others making direct bank deposits now," Neil reminded him. "True, sometimes I find an identity card stuck to the wrong part of a casing, but the new bank account must be growing."

"Yeah," mused Olson. "Well, anyway, we got about enough."

He flourished another paper.

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"I was already lookin' around when this ad came in the mail. There are three or four local robovendor outfits for sale at quite a bargain."

Neil reached for the circular. It had been sent by a business-exchange agency to Olson's account number in care of the bank.

"Find you everywhere, don't they?" he murmured. "Some of the machines brought these back from the banking windows, too. I meant to give them to you."

"They must hit every big account. But that's O.K.—just what I want!"

"What for?"

"To sell out!" Olson grinned, running a hand through his sandy hair. "Don't worry, Neil. We're gonna do it again, but bigger an' better. Who's got the only vendor service in this corner of the city that's makin' money?"

"Why . . . I guess you have."

"An' here's a list of companies that're losin', an' discouraged, an' ready to sell out cheap. But they might go good—with the right management!"

Neil's toothy grin emerged slowly. He wiped his oily hands on the chest of his coveralls as he considered the possibilities.

"If you take more than one, I'll have to have some help," he said.

"You watch!" said Olson. "With a good price for this outfit, I'll get three or four, an' you an' Dora can have whatever help you want."

In the end, after much correspondence and many visiphone calls to the bank, Olson accomplished what he promised. The buyer found by the business-exchange agency demanded a confidential transaction, which Olson suspected meant the offer came from a chain operator, but the price was more than satisfactory. The money enabled Olson to close deals with four near-bankrupt competitors.

The only disappointment developed when the purchaser insisted that someone familiar with the shop be allowed to remain. Olson salved his conscience by getting the business exchange to promise a large salary increase for Dora.

Then he and Neil set about inspecting and modifying the operations of Olson's new combined resources.

They immediately began to make money, by the ton.

Then they made it by the handful.

In a month, they were breaking even.

After that, they began to lose, no matter how they scrambled. Olson had to lay off some of Neil's help.

He found the robotech one day with three of the green robovendors all but eviscerated, parts strewn over his new workbench. Neil wiped a smear of oil from his forehead with the back of his hand.

"These are still programmed the way they tried to match us," he reported. "I can do better now."

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"I wish you could," said Olson gloomily.

"Sure I can. I've already got seven vendor-and-shill teams operating. Just give me a chance to catch up to the rest of these. Then I can get at the Tru-Blu Company lineup, and—"

"An' they won't work any better'n what we got out now," said Olson.

"Huh?"

"All the greens just came in empty, just like the models you ain't touched."

"But they *couldn't!* I don't think I—"

Olson held up a hand.

"It ain't your fault, Neil. Nobody could do what you done. But the sale was on condition that nothin' would be changed. Whatever Dozen an' the others were doin', I guess they still are . . . somehow."

"But they can't! I set these machines to match our old ones, except maybe Dozen, and he can't be everywhere!"

Olson sat himself carefully on an empty crate, and stared blankly at the floor.

Neil scratched his head with the screwdriver he had been using.

"Who's running the old outfit now?" he asked. "Did you ever find out?"

"Naw. I phoned Dora a few times. Her instructions come by the fax machine, the goods get loaded by a coupla kids she was told to hire, an' the money gets deposited by the robots. You can bet some of it's our money, if only we knew how!"

"And *she* doesn't know how?"

"She don't know how. You don't know how. I don't know how. But I know one thing—we're pushin' these babies here into another beat instead of the concourse, even if they have to take trains somewhere!"

Neil leaned against his workbench, brow furrowed.

"You know, there'll be somebody already operating in any other territory," he reminded Olson. "It might be tough to break in."

His boss looked up at him.

"How to break in I know just fine," he told Neil. "We do a swell job of that. What I can't figure is how to keep from *bein' broke 'n on.*"

"There must be some way," mused Neil. "If we could just figure out who's doing this to us, maybe we could—"

"Don't think about it," Olson advised him grimly.

He rose from his crate and ambled toward the door.

"I thought about it all night, an' maybe I got the answer. It'd give you heartburn, too, an' you prob'ly wouldn't believe it anyway."

He opened the door and peered out with a haunted look.

"But—"

"*Just don't!*" Olson repeated.

He shut the door gently behind him. ■

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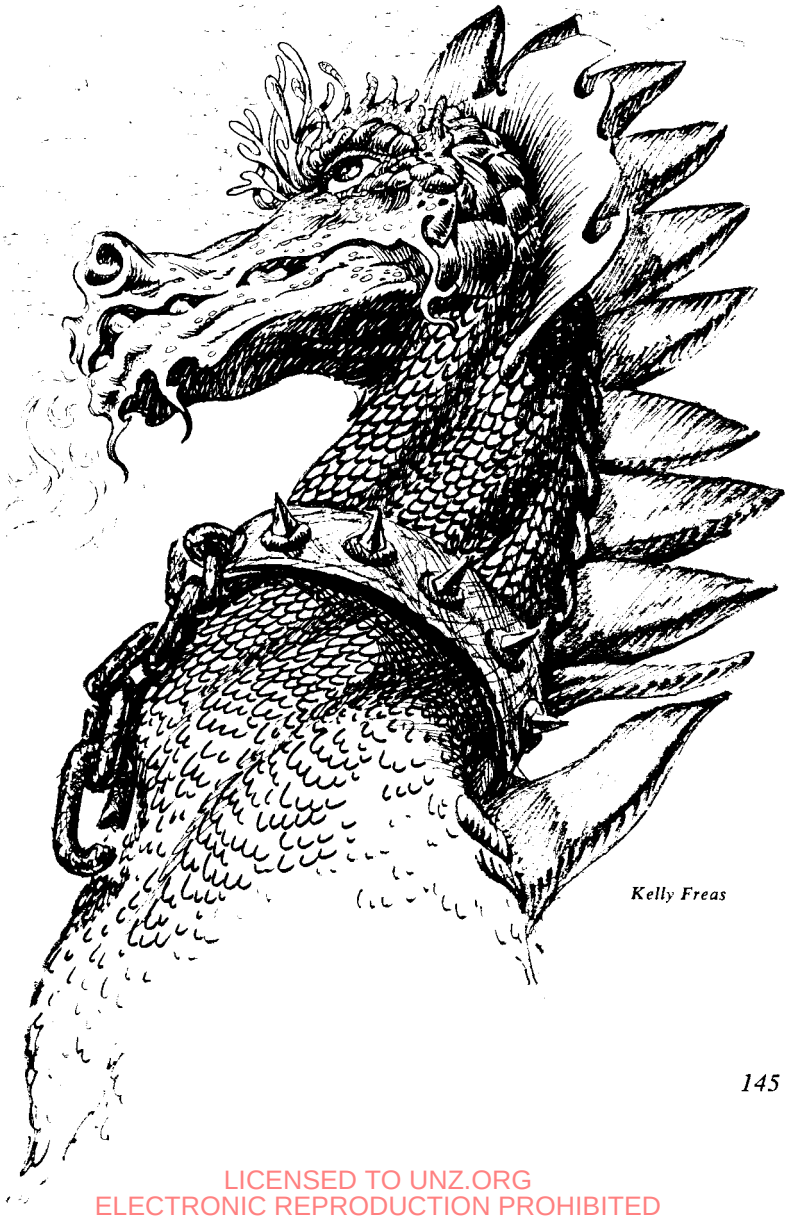
THE LAST COMMAND / KEITH LAUMER

To make a machine intelligent,
you must give it the power to judge information—
and that is the power to be unreliable!



Kelly Freas

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I come to awareness, sensing a residual oscillation traversing my hull from an arbitrarily designated heading of 035. From the damping rate I compute that the shock was of intensity 8.7, emanating from a source within the limits 72 meters/46 meters. I activate my primary screens, trigger a return salvo. There is no response. I engage reserve energy cells, bring my secondary battery to bear—futilely. It is apparent that I have been ranged by the Enemy and severely damaged.

My positional sensors indicate that I am resting at an angle of 13 degrees 14 seconds, deflected from a base line at 21 points from median. I attempt to right myself, but encounter massive resistance. I activate my forward scanners, shunt power to my IR microstrobes. Not a flicker illuminates my surroundings. I am encased in utter blackness.

Now a secondary shock wave approaches, rocks me with an intensity of 8.2. It is apparent that I must withdraw from my position—but my drive trains remain inert under full thrust. I shift to base emergency power, try again. Pressure mounts; I sense my awareness fading under the intolerable strain; then, abruptly, resistance falls off and I am in motion.

It is not the swift maneuvering of full drive, however, I inch forward, as if restrained by massive barriers. Again I attempt to penetrate the surrounding darkness, and this time perceive great irregular outlines shot through with fracture planes. I probe cautiously, then more vigorously, encountering incredible densities.

I channel all available power to a single ranging pulse, direct it upward. The indication is so at variance with all experience that I repeat the test at a new angle. Now I must accept the fact: I am buried under 207.6 meters of solid rock!

I direct my attention to an effort to orient myself to my uniquely desperate situation. I run through an action-status check list of thirty thousand items, feel dismay at the extent of power loss. My main cells are almost completely drained, my reserve units at no more than .4 charge. Thus my sluggishness is explained. I review the tactical situation, recall the triumphant announcement from my commander that the Enemy forces are annihilated, that all resistance has ceased. In memory, I review the formal procession; in company with my comrades of the Dinochrome Brigade, many of us deeply scarred by Enemy action, we parade before the Grand Commandant, then assemble on the depot ramp. At command, we bring our music storage cells into phase and display our Battle Anthem. The nearby star radiates over a full spectrum, unfiltered by atmospheric haze. It is a moment of glorious triumph. Then the final command is given—

The rest is darkness. But it is ap-

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parent that the victory celebration was premature. The Enemy has counterattacked with a force that has come near to immobilizing me. The realization is shocking, but the .1 second of leisurely introspection has clarified my position. At once, I broadcast a call on Brigade Action wavelength:

"Unit LNE to Command, requesting permission to file VSR."

I wait, sense no response, call again, using full power. I sweep the enclosing volume of rock with an emergency alert warning. I tune to the all-units band, await the replies of my comrades of the Brigade. None answers. Now I must face the reality: I alone have survived the assault.

I channel my remaining power to my drive and detect a channel of reduced density. I press for it and the broken rock around me yields reluctantly. Slowly, I move forward and upward. My pain circuitry shocks my awareness center with emergency signals: I am doing irreparable damage to my overloaded neural systems, but my duty is clear: I must seek and engage the Enemy.

Emerging from behind the blast barrier, Chief Engineer Pete Reynolds of the New Devonshire Port Authority pulled off his rock mask and spat grit from his mouth.

"That's the last one; we've bottomed out at just over two hundred yards. Must have hit a hard stratum down there."

"It's almost sundown," the paunchy man beside him said shortly. "You're a day and a half behind schedule."

"We'll start backfilling now, Mr. Mayor. I'll have pilings poured by oh-nine hundred tomorrow, and with any luck the first section of pad will be in place in time for the rally."

"I'm . . ." The mayor broke off, looked startled. "I thought you told me that was the last charge to be fired . . ."

Reynolds frowned. A small but distinct tremor had shaken the ground underfoot. A few feet away, a small pebble balanced atop another toppled and fell with a faint clatter.

"Probably a big rock fragment falling," he said. At that moment, a second vibration shook the earth, stronger this time. Reynolds heard a rumble and a distant impact as rock fell from the side of the newly blasted excavation. He whirled to the control shed as the door swung back and Second Engineer Mayfield appeared.

"Take a look at this, Pete!" Reynolds went across to the hut, stepped inside. Mayfield was bending over the profiling table.

"What do you make of it?" he pointed. Superimposed on the heavy red contour representing the detonation of the shaped charge of the had completed the drilling of the final pile core were two other traces, weak but distinct.

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"About .1 intensity," Mayfield looked puzzled. "What . . ."

The tracking needle dipped suddenly, swept up the screen to peak at .21, dropped back. The hut trembled. A stylus fell from the edge of the table. The red face of Mayor Daugherty burst through the door.

"Reynolds, have you lost your mind? What's the idea of blasting while I'm standing out in the open? I might have been killed!"

"I'm not blasting," Reynolds snapped. "Jim, get Eaton on the line, see if they know anything." He stepped to the door, shouted.

A heavyset man in sweat-darkened coveralls swung down from the seat of a cable-lift rig. "Boss, what goes on?" he called as he came up. "Damn near shook me out of my seat!"

"I don't know. You haven't set any trim charges?"

"No, Boss. I wouldn't set no charges without your say-so."

"Come on." Reynolds started out across the rubble-littered stretch of barren ground selected by the Authority as the site of the new spaceport. Halfway to the open mouth of the newly blasted pit, the ground under his feet rocked violently enough to make him stumble. A gout of dust rose from the excavation ahead. Loose rock danced on the ground. Beside him, the drilling chief grabbed his arm.

"Boss, we better get back!"

Reynolds shook him off, kept going. The drill chief swore and followed. The shaking of the ground went on, a sharp series of thumps interrupting a steady trembling.

"It's a quake!" Reynolds yelled over the low rumbling sound. He and the chief were at the rim of the core now.

"It can't be a quake, Boss," the latter shouted. "Not in these formations!"

"Tell it to the geologists . . ." The rock slab they were standing on rose a foot, dropped back. Both men fell. The slab bucked like a small boat in choppy water.

"Let's get out of here!" Reynolds was up and running. Ahead, a fissure opened, gaped a foot wide. He jumped it, caught a glimpse of black depths, a glint of wet clay twenty feet below—

A hoarse scream stopped him in his tracks. He spun, saw the drill chief down, a heavy splinter of rock across his legs. He jumped to him, heaved at the rock. There was blood on the man's shirt. The chief's hands beat the dusty rock before him. Then other men were there, grunting, sweaty hands gripping beside Reynolds'. The ground rocked. The roar from under the earth had risen to a deep, steady rumble. They lifted the rock aside, picked up the injured man and stumbled with him to the aid shack.

The mayor was there, white-faced.

"What is it, Reynolds? If you're responsible—"

"Shut up!" Reynolds brushed him

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aside, grabbed the phone, punched keys.

"Eaton! What have you got on this temblor?"

"Temblor, hell." The small face on the four-inch screen looked like a ruffled hen. "What in the name of Order are you doing out there? I'm reading a whole series of displacements originating from that last core of yours! What did you do, leave a pile of trim charges lying around?"

"It's a quake. Trim charges, hell! This thing's broken up two hundred yards of surface rock. It seems to be traveling north-northeast—"

"I see that; a traveling earthquake!" Eaton flapped his arms, a tiny and ridiculous figure against a background of wall charts and framed diplomas. "Well . . . do something, Reynolds! Where's Mayor Daugherty?"

"Underfoot!" Reynolds snapped, and cut off.

Outside, a layer of sunset-stained dust obscured the sweep of level plain. A rock-dozer rumbled up, ground to a halt by Reynolds. A man jumped down.

"I got the boys moving equipment out," he panted. "The thing's cutting a trail straight as a rule for the highway!" He pointed to a raised roadbed a quarter-mile away.

"How fast is it moving?"

"She's done a hundred yards; it hasn't been ten minutes yet!"

"If it keeps up another twenty minutes, it'll be into the intermix!"

"Scratch a few million cees and six months' work then, Pete!"

"And Southside Mall's a couple miles farther."

"Hell, it'll damp out before then!"

"Maybe. Grab a field car, Dan."

"Pete!" Mayfield came up at a trot. "This thing's building! The centroid's moving on a heading of 022—"

"How far sub-surface?"

"It's rising; started at two-twenty yards, and it's up to one-eighty!"

"What have we stirred up?" Reynolds stared at Mayfield as the field car skidded to a stop beside them.

"Stay with it, Jim. Give me anything new. We're taking a closer look." He climbed into the rugged vehicle.

"Take a blast truck—"

"No time!" He waved and the car gunned away into the pall of dust.

The rock car pulled to a stop at the crest of the three-level Intermix on a lay-by designed to permit tourists to enjoy the view of the site of the proposed port, a hundred feet below. Reynolds studied the progress of the quake through field glasses. From this vantage point, the path of the phenomenon was a clearly defined trail of tilted and broken rock, some of the slabs twenty feet across. As he watched, the fissure lengthened.

"It looks like a mole's trail." Reynolds handed the glasses to his companion, thumbed the Send key on the car radio.

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"Jim, get Eaton and tell him to divert all traffic from the Circular south of Zone Nine. Cars are already clogging the right-of-way. The dust is visible from a mile away, and when the word gets out there's something going on, we'll be swamped."

"I'll tell him, but he won't like it!"

"This isn't politics! This thing will be into the outer pad area in another twenty minutes!"

"It won't last—"

"How deep does it read now?"

"One-five!" There was a moment's silence. "Pete, if it stays on course, it'll surface at about where you're parked!"

"Uh-huh. It looks like you can scratch one Intermix. Better tell Eaton to get a story ready for the press."

"Pete—talking about newshounds," Dan said beside him. Reynolds switched off, turned to see a man in a gay-colored driving outfit coming across from a battered Monojag sportster which had pulled up behind the rock car. A big camera case was slung across his shoulder.

"Say, what's going on down there?" he called.

"Rock slide," Reynolds said shortly. "I'll have to ask you to drive on. The road's closed . . ."

"Who're you?" The man looked belligerent.

"I'm the engineer in charge. Now pull out, brother." He turned back to the radio. "Jim, get every piece of heavy equipment we own over here, on the double." He paused, feeling a minute trembling in the car. "The Intermix is beginning to feel it," he went on. "I'm afraid we're in for it. Whatever that thing is, it acts like a solid body boring its way through the ground. Maybe we can barricade it."

"Barricade an earthquake?"

"Yeah . . . I know how it sounds . . . but it's the only idea I've got."

"Hey . . . what's that about an earthquake?" The man in the colored suit was still there. "By gosh, I can feel it—the whole bridge is shaking!"

"Off, Mister—now!" Reynolds jerked a thumb at the traffic lanes where a steady stream of cars was hurtling past. "Dan, take us over to the main track. We'll have to warn this traffic off . . ."

"Hold on, fellow," the man unlimbered his camera. "I represent the New Devon *Scope*. I have a few questions—"

"I don't have the answers," Pete cut him off as the car pulled away.

"Hah!" the man who had questioned Reynolds yelled after him. "Big shot! Think you can . . ." His voice was lost behind them.

In a modest retirees' apartment block in the coast town of Icebreeze, forty miles from the scene of the freak quake, an old man sat in a reclining chair, half dozing before a yammering Tri-D tank.

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". . . Grandpa," a sharp-voiced young woman was saying. "It's time for you to go in to bed."

"Bed? Why do I want to go to bed? Can't sleep anyway . . ." He stirred, made a pretense of sitting up, showing an interest in the Tri-D. "I'm watching this show."

"It's not a show, it's the news," a fattish boy said disgustedly. "Ma, can I switch channels—"

"Leave it alone, Bennie," the old man said. On the screen, a panoramic scene spread out, a stretch of barren ground across which a furrow showed. As he watched, it lengthened.

". . . Up here at the Intermix we have a fine view of the whole curious business, lazangemmun," the announcer chattered. "And in our opinion it's some sort of publicity stunt staged by the Port Authority to publicize their controversial Port project—"

"Ma, can I change channels?"

"Go ahead, Bennie—"

"Don't touch it," the old man said. The fattish boy reached for the control, but something in the old man's eye stopped him.

"The traffic's still piling up here," Reynolds said into the phone. "Damn it, Jim, we'll have a major jam on our hands—"

"He won't do it, Pete! You know the Circular was his baby—the super all-weather pike that nothing could shut down. He says you'll have to handle this in the field—"

"Handle, hell! I'm talking about preventing a major disaster! And in a matter of minutes, at that!"

"I'll try again—"

"If he says no, divert a couple of the big ten-yard graders and block it off yourself. Set up field 'arcs, and keep any cars from getting in from either direction."

"Pete, that's outside your authority!"

"You heard me!"

Ten minutes later, back at ground level, Reynolds watched the boom-mounted polyarcs swinging into position at the two roadblocks a quarter of a mile apart, cutting off the threatened section of the raised expressway. A hundred yards from where he stood on the rear cargo deck of a light grader rig, a section of rock fifty feet wide rose slowly, split, fell back with a ponderous impact. One corner of it struck the massive pier supporting the extended shelf of the lay-by above. A twenty-foot splinter fell away, exposing the reinforcing-rod core.

"How deep, Jim?" Reynolds spoke over the roaring sound coming from the disturbed area.

"Just subsurface now, Pete! It ought to break through—" His voice was drowned in a rumble as the damaged pier shivered, rose up, buckled at its midpoint and collapsed, bringing down with it a large chunk of pavement and guard rail, and a single still-glowing light pole. A small car that had been

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parked on the doomed section was visible for an instant just before the immense slab struck. Reynolds saw it bounce aside, then disappear under an avalanche of broken concrete.

"My God, Pete—" Dan blurted. "That damned fool newshound—!"

"Look!" As the two men watched, a second pier swayed, fell backward into the shadow of the span above. The roadway sagged, and two more piers snapped. With a bellow like a burst dam, a hundred-foot stretch of the road fell into the roiling dust cloud.

"Pete!" Mayfield's voice burst from the car radio. "Get out of there! I threw a reader on that thing and it's chattering . . . !"

Among the piled fragments, something stirred, heaved, rising up, lifting multi-ton pieces of the broken road, thrusting them aside like so many potato chips. A dull blue radiance broke through from the broached earth, threw an eerie light on the shattered structure above. A massive, ponderously irresistible shape thrust forward through the ruins. Reynolds saw a great blue-glowing profile emerge from the rubble like a surfacing submarine, shedding a burden of broken stone, saw immense treads ten feet wide claw for purchase, saw the mighty flank brush a still standing pier, send it crashing aside.

"Pete . . . what . . . what is it—?"

"I don't know." Reynolds broke the paralysis that had gripped him. "Get us out of here, Dan, fast! Whatever it is, it's headed straight for the city!"

I emerge at last from the trap into which I had fallen, and at once encounter defensive works of considerable strength. My scanners are dulled from lack of power, but I am able to perceive open ground beyond the barrier, and farther still, at a distance of 5.7 kilometers, massive walls. Once more I transmit the Brigade Rally signal; but as before, there is no reply. I am truly alone.

I scan the surrounding area for the emanations of Enemy drive units, monitor the EM spectrum for their communications. I detect nothing; either my circuitry is badly damaged, or their shielding is superb.

I must now make a decision as to possible courses of action. Since all my comrades of the Brigade have fallen, I compute that the walls before me must be held by Enemy forces. I direct probing signals at the defenses, discover them to be of unfamiliar construction, and less formidable than they appear. I am aware of the possibility that this may be a trick of the Enemy; but my course is clear.

I re-engage my driving engines and advance on the Enemy fortress.

"You're out of your mind, Father," the stout man said. "At your age—"

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"At your age, I got my nose smashed in a brawl in a bar on Aldo," the old man cut him off. "But I won the fight."

"James, you can't go out at this time of night. . . ." an elderly woman wailed.

"Tell them to go home." The old man walked painfully toward his bedroom door. "I've seen enough of them for today."

"Mother, you won't let him do anything foolish?"

"He'll forget about it in a few minutes; but maybe you'd better go now and let him settle down."

"Mother . . . I really think a home is the best solution."

"Yes, Grandma," the young woman nodded agreement. "After all, he's past ninety—and he has his veteran's retirement . . ."

Inside his room, the old man listened as they departed. He went to the closet, took out clothes, began dressing.

City Engineer Eaton's face was chalk-white on the screen.

"No one can blame me," he said. "How could I have known—"

"Your office ran the surveys and gave the PA the green light," Mayor Daugherty yelled.

"All the old survey charts showed was 'Disposal Area'." Eaton threw out his hands. "I assumed—"

"As City Engineer, you're not paid to make assumptions! Ten minutes' research would have told you that was a 'Y' category area!"

"What's 'Y' category mean?" Mayfield asked Reynolds. They were standing by the field comm center, listening to the dispute. Nearby, boom-mounted tri-D cameras hummed, recording the progress of the immense machine, its upper turret rearing forty-five feet into the air, as it ground slowly forward across smooth ground toward the city, dragging behind it a trailing festoon of twisted reinforcing iron crusted with broken concrete.

"Half-life over one hundred years," Reynolds answered shortly. "The last skirmish of the war was fought near here. Apparently this is where they buried the radioactive equipment left over from the battle."

"But, that was more than seventy years ago—"

"There's still enough residual radiation to contaminate anything inside a quarter mile radius."

"They must have used some hellish stuff." Mayfield stared at the dull shine half a mile distant.

"Reynolds, how are you going to stop this thing?" The mayor had turned on the PA Engineer.

"Me stop it? You saw what it did to my heaviest rigs: flattened them like pancakes. You'll have to call out the military on this one, Mr. Mayor."

"Call in Federation forces? Have them meddling in civic affairs?"

"The station's only sixty-five miles from here. I think you'd better call them fast. It's only moving

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at about three miles per hour but it will reach the south edge of the Mall in another forty-five minutes."

"Can't you mine it? Blast a trap in its path?"

"You saw it claw its way up from six hundred feet down. I checked the specs; it followed the old excavation tunnel out. It was rubble-filled and capped with twenty-inch compressed concrete."

"It's incredible," Eaton said from the screen. "The entire machine was encased in a ten-foot shell of reinforced armocrete. It had to break out of that before it could move a foot!"

"That was just a radiation shield; it wasn't intended to restrain a Bolo Combat Unit."

"What *was*, may I inquire?" The mayor glared.

"The units were deactivated before being buried," Eaton spoke up, as if he were eager to talk. "Their circuits were fused. It's all in the report—"

"The report you should have read somewhat sooner," the mayor snapped.

"What . . . what started it up?" Mayfield looked bewildered. "For seventy years it was down there, and nothing happened!"

"Our blasting must have jarred something," Reynolds said shortly. "Maybe closed a relay that started up the old battle reflex circuit."

"You know something about these machines?" The mayor asked.

"I've read a little."

"Then speak up, man. I'll call the station, if you feel I must. What measures should I request?"

"I don't know, Mr. Mayor. As far as I know, nothing on New Devon can stop that machine now."

The mayor's mouth opened and closed. He whirled to the screen, blanked Eaton's agonized face, punched in the code for the Federation Station.

"Colonel Blane!" he blurted as a stern face came onto the screen. "We have a major emergency on our hands! I'll need everything you've got! This is the situation—"

I encounter no resistance other than the flimsy barrier, but my progress is slow. Grievous damage has been done to my main-drive sector due to overload during my escape from the trap; and the failure of my sensing circuitry has deprived me of a major portion of my external receptivity. Now my pain circuits project a continuous signal to my awareness center; but it is my duty to my commander and to my fallen comrades of the Brigade to press forward at my best speed; but my performance is a poor shadow of my former ability.

And now at last the Enemy comes into action! I sense aerial units closing at supersonic velocities; I lock my lateral batteries to them and direct salvo fire; but I sense that the arming mechanisms clatter harmlessly. The craft sweep over me, and my impotent guns elevate,

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track them as they release detonants that spread out in an envelopmental pattern which I, with my reduced capabilities, am powerless to avoid. The missiles strike; I sense their detonations all about me; but I suffer only trivial damage. The Enemy has blundered if he thought to neutralize a Mark XXVIII Combat Unit with mere chemical explosives! But I weaken with each meter gained.

Now there is no doubt as to my course. I must press the charge and carry the walls before my reserve cells are exhausted.

From a vantage point atop a bucket rig four hundred yards from the position the great fighting machine had now reached, Pete Reynolds studied it through night glasses. A battery of beamed polyarcs pinned the giant hulk, scarred and rust-scaled, in a pool of blue-white light. A mile and a half beyond it, the walls of the Mall rose sheer from the garden setting.

"The bombers slowed it some," he reported to Eaton via scope. "But it's still making better than two miles per hour. I'd say another twenty-five minutes before it hits the main ring-wall. How's the evacuation going?"

"Badly! I get no cooperation! You'll be my witness, Reynolds, I did all I could—"

"How about the mobile batteries: how long before they'll be in position?" Reynolds cut him off.

"I've heard nothing from Federation Central—typical militaristic arrogance, not keeping me informed—but I have them on my screens. They're two miles out—say three minutes."

"I hope you made your point about N-heads."

"That's outside my province!" Eaton said sharply. "It's up to Brand to carry out this portion of the operation!"

"The HE Missiles didn't do much more than clear away the junk it was dragging," Reynolds' voice was sharp.

"I wash my hands of responsibility for civilian lives," Eaton was saying when Reynolds shut him off, changed channels.

"Jim, I'm going to try to divert it," he said crisply. "Eaton's sitting on his political fence; the Feds are bringing artillery up, but I don't expect much from it. Technically, Brand needs Sector O.K. to use Nuclear stuff, and he's not the boy to stick his neck out—"

"Divert it how? Pete, don't take any chances—"

Reynolds laughed shortly. "I'm going to get around it and drop a shaped drilling charge in its path. Maybe I can knock a tread off. With luck, I might get its attention on me, and draw it away from the Mall. There are still a few thousand people over there, glued to their Tri-D's. They think it's all a swell show."

"Pete, you can't walk up on that thing! It's hot . . ." He broke off.

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"Pete—there's some kind of nut here—he claims he has to talk to you; says he knows something about that damned juggernaut. Shall I send . . . ?"

Reynolds paused with his hand on the cut-off switch. "Put him on," he snapped. Mayfield's face moved aside and an ancient, bleary-eyed visage stared out at him. The tip of the old man's tongue touched his dry lips.

"Son, I tried to tell this boy here, but he wouldn't listen—"

"What have you got, old-timer?" Pete cut in. "Make it fast."

"My name's Sanders. James Sanders. I'm . . . I was with the Planetary Volunteer Scouts, back in '71—"

"Sure, Dad," Pete said gently. "I'm sorry, I've got a little errand to run—"

"Wait . . ." The old man's face worked. "I'm old, Son—too damned old. I know. But bear with me. I'll try to say it straight. I was with Hayle's squadron at Toledo. Then afterwards, they shipped us . . . but hell, you don't care about that! I keep wandering, Son; can't help it. What I mean to say is—I was in on that last scrap, right here at New Devon—only we didn't call it New Devon then. Called it Hellport. Nothing but bare rock and Enemy emplacements . . ."

"You were talking about the battle, Mr. Sanders," Pete said tensely. "Go on with that part."

"Lieutenant Sanders," the oldster said. "Sure, I was Acting Brigade Commander. See, our major was hit at Toledo—and after Tommy Chee stopped a sidewinder . . ."

"Stick to the point, Lieutenant!"

"Yes, sir!" the old man pulled himself together with an obvious effort. "I took the Brigade in; put out flankers, and ran the Enemy into the ground. We mopped 'em up in a thirty-three hour running fight that took us from over by Crater Bay all the way down here to Hellport. When it was over, I'd lost six units, but the Enemy was done. They gave us Brigade Honors for that action. And then . . ."

"Then what?"

"Then the triple-dyed yellow-bottoms at Headquarters put out the order the Brigade was to be scrapped; said they were too hot to make decon practical. Cost too much, they said! So after the final review . . ." He gulped, blinked. "They planted 'em deep, two hundred meters, and poured in special High-R concrete."

"And packed rubble in behind them," Reynolds finished for him. "All right, Lieutenant, I believe you! But what started that machine on a rampage?"

"Should have known they couldn't hold down a Bolo Mark XXVIII!" The old man's eyes lit up. "Take more than a few million tons of rock to stop Lenny when his battle board was lit!"

"Lenny?"

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"That's my old Command Unit out there, Son. I saw the markings on the 3-D. Unit LNE of the Dinochrome Brigade!"

"Listen!" Reynolds snapped out. "Here's what I intend to try . . ." he outlined his plan.

"Ha!" Sanders snorted. "It's quite a notion, Mister, but Lenny won't give it a sneeze."

"You didn't come here to tell me we were licked," Reynolds cut in. "How about Brand's batteries?"

"Hell, Son, Lenny stood up to point-blank Hellbore fire on Toledo, and—"

"Are you telling me there's nothing we can do?"

"What's that? No, Son, that's not what I'm saying . . ."

"Then what!"

"Just tell these johnnies to get out of my way, Mister. I think I can handle him."

At the field Comm hut, Pete Reynolds watched as the man who had been Lieutenant Sanders of the Volunteer Scouts pulled shiny black boots over his thin ankles, and stood. The blouse and trousers of royal blue polyon hung on his spare frame like wash on a line. He grinned, a skull's grin.

"It doesn't fit like it used to; but Lenny will recognize it. It'll help. Now, if you've got that power pack ready . . ."

Mayfield handed over the old-fashioned field instrument Sanders had brought in with him.

"It's operating, sir—but I've already tried everything I've got on that infernal machine; I didn't get a peep out of it."

Sanders winked at him. "Maybe I know a couple of tricks you boys haven't heard about." He slung the strap over his bony shoulder and turned to Reynolds.

"Guess we better get going, Mister. He's getting close."

In the rock car Sanders leaned close to Reynolds' ear. "Told you those Federal guns wouldn't scratch Lenny. They're wasting their time."

Reynolds pulled the car to a stop at the crest of the road, from which point he had a view of the sweep of ground leading across to the city's edge. Lights sparkled all across the towers of New Devon. Close to the walls, the converging fire of the ranked batteries of infinite repeaters drove into the glowing bulk of the machine, which plowed on, undeterred. As he watched, the firing ceased.

"Now, let's get in there, before they get some other scheme going," Sanders said.

The rock car crossed the rough ground, swung wide to come up on the Bolo from the left side. Behind the hastily-rigged radiation cover, Reynolds watched the immense silhouette grow before him.

"I knew they were big," he said. "But to see one up close like this—" He pulled to a stop a hundred feet from the Bolo.

"Look at the side ports," Sanders

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said, his voice crisper now. "He's firing anti-personnel charges—only his plates are flat. If they weren't, we wouldn't have gotten within half a mile." He unclipped the microphone and spoke into it:

"Unit LNE, break off action and retire to ten-mile line!"

Reynolds' head jerked around to stare at the old man. His voice had rung with vigor and authority as he spoke the command.

The Bolo ground slowly ahead. Sanders shook his head, tried again.

"No answer, like that fella said. He must be running on nothing but memories now . . ." He reattached the microphone and before Reynolds could put out a hand, had lifted the anti-R cover and stepped off on the ground.

"Sanders—get back in here!" Reynolds yelled.

"Never mind, Son. I've got to get in close. Contact induction." He started toward the giant machine. Frantically, Reynolds started the car, slammed it into gear, pulled forward.

"Better stay back," Sanders' voice came from his field radio. "This close, that screening won't do you much good."

"Get in the car!" Reynolds roared. "That's hard radiation!"

"Sure; feels funny, like a sunburn, about an hour after you come in from the beach and start to think maybe you got a little too much." He laughed. "But I'll get to him . . ."

Reynolds braked to a stop, watched the shrunken figure in the baggy uniform as it slogged forward, leaning as against a sleetstorm.

"I'm up beside him," Sanders' voice came through faintly on the field radio. "I'm going to try to swing up on his side. Don't feel like trying to chase him any farther."

Through the glasses, Reynolds watched the small figure, dwarfed by the immense bulk of the fighting machine as he tried, stumbled, tried again, swung up on the flange running across the rear quarter inside the churning bogie wheel.

"He's up," he reported. "Damned wonder the track didn't get him before . . ."

Clinging to the side of the machine, Sanders lay for a moment, bent forward across the flange. Then he pulled himself up, wormed his way forward to the base of the rear quarter turret, wedged himself against it. He unslung the communicator, removed a small black unit, clipped it to the armor; it clung, held by a magnet. He brought the microphone up to his face.

In the Comm shack Mayfield leaned toward the screen, his eyes squinted in tension. Across the field Reynolds held the glasses fixed on the man lying across the flank of the Bolo. They waited.

The walls are before me, and I ready myself for a final effort, but suddenly I am aware of trickle cur-

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rents flowing over my outer surface. Is this some new trick of the Enemy? I tune to the wave-energies, trace the source. They originate at a point in contact with my aft port armor. I sense modulation, match receptivity to a computed pattern. And I hear a voice:

"Unit LNE, break it off, Lenny. We're pulling back now, Boy! This is Command to LNE: pull back to ten miles. If you read me, Lenny, swing to port and halt."

I am not fooled by the deception. The order appears correct, but the voice is not that of my Commander. Briefly I regret that I cannot spare energy to direct a neutralizing power flow at the device the Enemy has attached to me. I continue my charge.

"Unit LNE! Listen to me, Boy; maybe you don't recognize my voice, but it's me! You see—some time has passed. I've gotten old. My voice has changed some, maybe. But it's me! Make a port turn, Lenny. Make it now!"

I am tempted to respond to the trick, for something in the false command seems to awaken secondary circuits which I sense have been long stilled. But I must not be swayed by the cleverness of the Enemy. My sensing circuitry has faded further as my energy cells drain; but I know where the Enemy lies. I move forward, but I am filled with agony, and only the memory of my comrades drives me on.

"Lenny, answer me. Transmit on the old private band—the one we agreed on. Nobody but me knows it, remember?"

Thus the Enemy seeks to beguile me into diverting precious power. But I will not listen.

"Lenny—not much time left. Another minute and you'll be into the walls. People are going to die. Got to stop you, Lenny. Hot here. My God, I'm hot. Not breathing too well, now. I can feel it; cutting through me like knives. You took a load of Enemy power, Lenny; and now I'm getting my share. Answer me, Lenny. Over to you . . ."

It will require only a tiny allocation of power to activate a communication circuit. I realize that it is only an Enemy trick, but I compute that by pretending to be deceived, I may achieve some trivial advantage. I adjust circuitry accordingly, and transmit:

"Unit LNE to Command. Contact with Enemy defensive line imminent. Request supporting fire!"

"Lenny . . . you can hear me! Good boy, Lenny! Now make a turn, to port. Walls . . . close . . ."

"Unit LNE to Command. Request positive identification; transmit code 685749."

"Lenny—I can't . . . don't have code blanks. But it's me . . ."

"In absence of recognition code, your transmission disregarded." *I send. And now the walls loom high above me. There are many lights, but I see them only vaguely. I am nearly blind now.*

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"Lenny—less'n two hundred feet to go. Listen, Lenny. I'm climbing down. I'm going to jump down, Lenny, and get around under your force scanner pickup. You'll see me, Lenny. You'll know me then."

The false transmission ceases. I sense a body moving across my side. The gap closes. I detect movement before me, and in automatic reflex fire anti-P charges before I recall that I am unarmed.

A small object has moved out before me, and taken up a position between me and the wall behind which the Enemy conceal themselves. It is dim, but appears to have the shape of a man. . . .

I am uncertain. My alert center attempts to engage inhibitory circuitry which will force me to halt, but it lacks power. I can override it. But still I am unsure. Now I must take a last risk, I must shunt power to my forward scanner to examine this obstacle more closely. I do so, and it leaps into greater clarity. It is indeed a man—and it is enclothed in regulation blues of the Volunteers. Now, closer, I see the face, and through the pain of my great effort, I study it . . .

"He's backed against the wall," Reynolds said hoarsely. "It's still coming. Fifty feet to go—"

"You were a fool, Reynolds!" the mayor barked. "A fool to stake everything on that old dotard's crazy ideas!"

"Hold it!" As Reynolds watched, the mighty machine slowed, halted, ten feet from the sheer wall before it. For a moment it sat, as though puzzled. Then it backed, halted again, pivoted ponderously to the left and came about.

On its side, a small figure crept up, fell across the lower gun deck. The Bolo surged into motion, retracing its route across the artillery-scarred gardens.

"He's turned it," Reynolds let his breath out with a shuddering sigh. "It's headed out for open desert. It might get twenty miles before it finally runs out of steam."

The strange voice that was the Bolo's came from the big panel before Mayfield:

"Command . . . Unit LNE reports main power cells drained, secondary cells drained; now operating at .037 percent efficiency, using Final Emergency Power. Request advice as to range to be covered before relief maintenance available."

"It's a long, long way, Lenny . ." Sanders' voice was a bare whisper. *"But I'm coming with you . . ."*

Then there was only the crackle of static. Ponderously, like a great, mortally stricken animal, the Bolo moved through the ruins of the fallen roadway, heading for the open desert.

"That damned machine," the mayor said in a hoarse voice. "You'd almost think it was alive."

"You would at that," Pete Reynolds said. ■

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P. Schuyler Miller

the reference library

A COUPLE OF "FIRSTS"

From time to time an anthologist with good contacts and a contract that lets him share royalties will include a previously unpublished story in one of his collections, or produce a book of all-new stories, never before published in magazines. The two "Tales of Space and Time" anthologies edited by Raymond J. Healy, one of the founding editors of *Fantasy & Science Fiction*, are among the first and best examples, and Frederik Pohl, now mentor of the *Ga'laxy* triplets, did a series of "Star Science Fiction" volumes which Ballantine originally published simultaneously in hard and softback format. As I recall, there were two books of short stories and novelettes and one of short novels.

The idea has by no means died, and John Carnell, the British counterpart of John Campbell as editor, discoverer and developer of top stories by top writers, has been editing a new series of hardback books entitled "New Writings in SF" for the London publisher, Dennis Dobson. Three have been published in England—perhaps four by the time you read this—and Bantam Books has started to reprint the series in paperback in the United States.

Moreover, G.P. Putnam's Sons and Damon Knight have teamed up for a United States series of hardback anthologies of all new stories, to be published under the "Orbit" tag.

There are nine good stories in "Orbit 1" (192 pp.; $3.50). I wouldn't say that any one is outstanding enough to be a contender for a "Hugo" or "Nebula" award as best of 1966, but the editor's high standards have seen to it that they are varied and very well written.

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Best, I think, is Richard McKenna's "The Secret Place," one of the last stories by a man who, before his sudden death, was becoming a major novelist. It brings the daydream world of a pair of lonely youngsters believably to life. Keith Roberts, in "The Deeps," offers a mood story of mother and daughter in the undersea keeps and James Blish, in "How Beautiful With Banners," takes us to the bleak world of Titan and creates a new, strange and beautiful life form.

Four of the nine writers are women. Kate Wilhelm, in "Staras Flonderans," has a story of the galactic future and a *Marie Celeste* mystery. Its gimmick is similar to but more believable than the one Lloyd Biggle Jr. made into a book in "Watchers of the Dark." Housewife Allison Rice—actually two housewives, since "she" is a collaboration—has a teasing little tale that proves—as all children know—that "The Loolies Are Here." Virginia Kidd, with "Kangaroo Court," has a long novelette of the "first contact" type which could well have been published here: powerful kangaroo-like extraterrestrials drop in to see what has happened to the colony they left here a while—a very long while, though they don't know it—back. And Sonya Dorman, in "Splice of Life," has a little story about future surgery that grows grimmer as you think.

The rest? Poul Anderson, in "The Disinherited," has one of his stories that consider forces and values in galactic colonization. And Thomas M. Disch, with "5 Eggs," has a comedy of inevitability.

"New Writings in SF 1" (Bantam No. F3245; 147 pp.; 50¢) offers five stories by writers of whom only Brian Aldiss may be familiar to those who haven't seen the English magazines that John Carnell formerly edited, *New Worlds* and *Science Fantasy*. They are, however, both English and America.

Aldiss' story, "Man On Bridge," is bound to get itself reprinted It offers a very nasty future in which the Cerebrals have shut themselves away from the boring and disgusting life of the Proles, with ugly results. Edward Mackin's "Key to Chaos" is as close as we've come in years to the broad, outrageous comedy of the great "Gallagher" yarns that "Lewis Padgett" used to write for Astounding. John Rankine's "Two's Company" I find rather trite with its girl-accepts-boy-under-peril plot, but Joseph Green and James Webbert—apart from some unbelievable chemistry—make the psychic perils of "Haggard Honeymoon" very convincing. Finally, in Damien Broderick's "The Sea's Furthest End," we have another of the many stories of galactic empire and the young heir who must pull it together to stave off the Long Night. This Australian does it well.

I hope Bantam gets on with its reprints of the other "New Writ-

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ings" volumes. And that other United States publishers take up the idea again.

"HUGO" TIME

At the 24th World Science Fiction Convention, held in Cleveland, Ohio over the Labor Day weekend, Frank Herbert's *tour de force* from these pages, "Dune," earned its second award: the "Hugo" for best science-fiction novel of 1965. (It had already won the first "Nebula" award of the Science Fiction Writers of America in the same category.)

However, for the first time in the history of the awards, the "Best Novel" citation was shared. Roger Zelazny's "And Call Me Conrad" from *Fantasy & Science Fiction* tied with "Dune," and the Tricon Committee awarded two Hugos. The Zelazny one-shot would have fallen into the SFWA "novella" category, whereas the fan awards have only one short fiction class. Here the Hugo went to another double winner, Harlan Ellison's "'Repent, Harlequin!' Said the Ticktockman" from *Galaxy,* which had won the pros' short story Nebula.

Analog—rather, its earlier incarnation, Astounding—scored in another, special Hugo category when Isaac Asimov's "Foundation" series was voted the best all-time series over such stiff contenders as Tolkien's "Lord of the Rings," Heinlein's "Future History," "Doc" Smith's "Lensman" series, and Edgar Rice Burroughs' Martian series.

Worlds of If, fast becoming Analog's chief rival in the pure science-fiction class, was named best professional magazine of 1965, probably for such serials as Smith's "Skylark Duquesne" and Heinlein's "The Moon Is a Harsh Mistress." The "Best Artist" award went to the paperbacks, to Frank Frazetta, and the "Best Amateur Magazine" award to Camille Cazedessus Jr.'s journal of Burroughs bibliophilia, "ERB-Dom," one of the handsomest fanzines I have ever seen.

After three ballots, New York won out as the site of the 1967 convention. For the first time in several years there was real competition: Baltimore, Boston and Syracuse made bids, and Syracuse hung on till the final ballot. Further details when I get them: for the moment, it's New York over Labor Day, '67. *This* one I really intend to get to.

THE PAPER DOLLS

By L. P. Davies • Doubleday & Co., Garden City, N.Y. • 1966 • 216 pp. • $3.95

This Crime Club novel—a first novel by a new English or Welsh author—turns out to be one of the best ESP stories we have had. The tantalizing slowness and smoothness with which the actual nature of the plot unfolds makes last year's touted yarn by old veteran

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Margery Allingham seem feeble.

The story is told by an English schoolmaster, Gordon Seacombe, who has been puzzled and disturbed by the tragic death of one of the schoolboys, who inexplicably threw himself off a roof. An odd twelve-year-old seems somehow involved, and the deeper Seacombe probes the stranger the relation seems. Young Rodney Blake turns out to be a foundling, one of twins, and to have a strong psionic tie with his unknown brother. Then it seems there must be a third child, and possibly a fourth, and there is something very strange about their origin.

The unraveling of the children's history would make an ordinary enough puzzle, were it not for the subtly revealed telepathic and psionic powers of the boys, which they use in their defense. Seacombe is scared out of his wits; so is the other teacher who has joined in his hunt; then they are nearly killed, and two innocent bystanders do die. As they close in on the abandoned hill farm where the boys were born, they find a manhunt—or, rather, a boy-hunt in progress. An American CIA agent (or a facsimile) gets into the act near the end, and the rationale for the children's powers seems both lame and unnecessary: I like to think that the publisher insisted on seeing some wheels, for the author's handling up to that point has been far too expert for the conventional mechanism to come naturally. It would have made a far more powerful and logical book—at least to readers accustomed to such themes —for the boys simply to have these mental powers, and to see them slowly forced into the open.

My complaint is, essentially, the same that I had with Dr. E. E. Smith's "Lensman" stories. As they were first published here in Astounding, the true nature of the war between good and evil, in which the Lensmen were involved, became evident only by gradual degrees. A seeming victory at the end of one serial turned out to be no such thing as the next began. When the book versions appeared, this cumulative suspense was destroyed, for "Doc" spelled out every detail of the struggle between Arisia and Eddore. From what he has said since, it was John Campbell who insisted on the form of the serials—and he was entirely right. I wish L. P. Davies had had a similar editor to help him or her with this fine first book.

BARBARELLA

By Jean-Claude Forest • Grove Press • New York • 1966 • $5.95

You classify this one! It's a hardback edition of episodes from a French science-fiction comic strip of a kind that brings those BEM's-and-busts covers of the "good old days" to life. Buck Rogers was never like this, and even Flash Gordon never quite made it. The strip has

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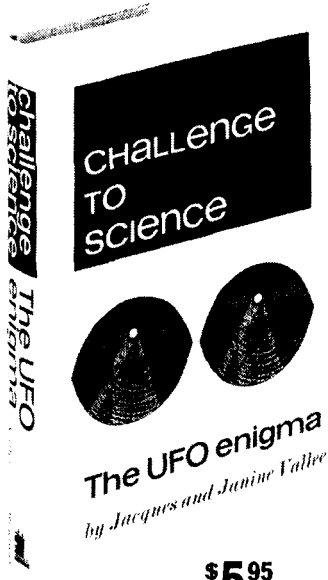

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been running in France since 1962; this sequence of six eight-page and two ten-page episodes is dated from 1964, by which time Barbarella—a heroine who looks like Brigitte Bardot and will be played in a Camp film by Jane Fonda—had become an institution. (This collection is said to have sold 20,000 copies in France.)

You meet Barbarella as she zooms in for a landing on the desolate planet Lythion. She crashes through the dome of a greenhouse city, is promptly involved in a revolution, gets her clothes off as soon as possible—with revolutionary results—and is off to other wild adventures with hideous monsters, lusty aliens—of both sexes—robots, blind angels . . .

I doubt that your public library will have this. A nearby college might. And I suppose there will be a paperback edition some day—parts were in *Evergreen Review*, one of the outlets of the Camp Establishment.

THE IMPOSSIBLE MAN

By J. G. Ballard • Berkley Books, New York • No. F-1204 • 160 pp. • 50¢

J. G. Ballard is every bit as much a stylist and experimenter as Ray Bradbury, with the difference that he never gives the impression of style for style's sake that spoils Bradbury's later work. Content is there, though it may not be wholly comprehensible, and the total effect made that of a vaguely recalled nightmare whose significance and symbolism are unclear sleeping or waking.

There are nine stories in this collection, and most of them have this nightmare quality. Often there is no real plot; things simply happen, revealing people to themselves, or illumining the world very strangely. You may prefer to call them fantasy, but the author's approach is quietly factual in all but, perhaps, his "Vermilion Sands" episodes.

"The Drowned Giant" is simply that: a giant, never explained, is washed up on an English beach. The narrator watches in growing disgust as the populace first entertains itself, then tries to exploit the decaying thing. We are shown ourselves in what may not be a distorting mirror.

"The Reptile Enclosure" has a little more rationale: perhaps the swarm of satellites, reflecting and concentrating cosmic radiation, will impel mankind into lemming-like reactions.

"The Delta at Sunset" can be considered a "straight" story of a man driven by his psychotic hallucinations, but "Storm-Bird, Storm-Dreamer" takes us back into the safety of nightmare, in a near future where chemical wastes have produced gigantism in many birds and mankind, or one man, is fighting for survival.

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OCTOBER THE FIRST IS TOO LATE

By Fred Hoyle • Harper & Row • New York • 1966 • 200 pp. • $3.95

MAN IN THE UNIVERSE

By Fred Hoyle • Columbia University Press • New York • 1966 • 81 pp. • $3.50

These two books are paired here for the unique reason that in two of the five essays which make up "Man in the Universe," the author has argued the theoretical background of his new science-fiction yarn. In the process he offers a kind of philosophical rationale for time travel or, rather, to the alternate worlds theme that is well established in science fiction. (John Brunner, in his contribution to our recent poll, credits J. C. Squire's "If It Had Happened Otherwise" with originating the concept. If this is the collection published over here as "If: or History Rewritten," I agree. It admits Winston Churchill to the company of major science-fiction writers.)

Hoyle, who is at present Professor of Theoretical Astronomy and Experimental Philosophy at Cambridge University, does not write just to kill time. In his two essays he is discussing his dissatisfaction with Heisenberg's Uncertainty Principle and with our physical concepts of the direction of Time. In his story, he uses his hypotheses to take his composer hero on a tour of various alternative presents, which for a while coexist on Earth: a Europe in which World War I is still being fought in the 1960s . . . in which Greece is in Pericles' "Golden Age" . . . in which America is in a pastoral future and Russia and Asia are one great glassy plain, fused by the explosion of the Sun even farther in the future.

Read the essays, read the novel, then go back to the essays.

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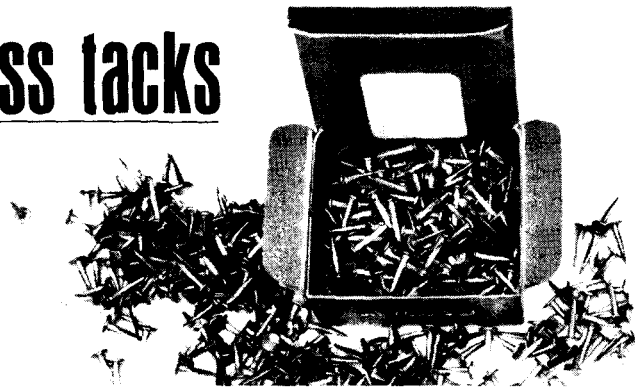

Dear Mr. Campbell:

I have read your Editorial in Analog for August, 1966, with great interest, but while everything you say is perfectly valid your discussion of the voting problem is an oversimplification. It all depends on how you define illiteracy and education.

Most of the tycoons who built up American industry were barely able to read and write. Their chief characteristics were smooth-talk and slick wits, and an ability to maintain rivalry among their more competent assistants. De Angelis, for example, was able to con millions of dollars out of reputedly the shrewdest men on Wall Street all of whom had had an Ivy League education and went to the best universities. The difference between a successful and a ruined tycoon is often only a matter of five minutes—strong nerves, luck, and an un-analytical mind are of greater value in business management than an education at the Harvard Business School which teaches "pure business management." (The Literature Courses you mentioned some time ago can be thought of as teaching the art of writing pure books.)

Two years of unremitting toil on the part of thousands of Economists and Scientific Advisers have produced nothing but a worthless National Plan, reams of out-of-date statistics, utter chaos and national bankruptcy. Most firms are now so deeply in the red, due to mismanagement by Oxford and Cambridge graduates (see *Newsweek* for July 25, "Britain at the Brink"), the Selective Employment Tax and extortion of the Local Councils which provide cozy nests for thousands of surplus graduates, that liquidation is the only way out of their troubles.

The best brains of America have got that country bogged down in a never-ending war in Vietnam; these best brains actually admit that their theories concerning the Far East were totally wrong, but the war is

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being fought and escalated on the basis of these false theories. (Actually, the dictionary defines a university graduate as a falsifier of facts and a fallacious reasoner. Is playing war games on a computer a sign of education, or ignorance?)

Other best brains have got the Space program going in ever-decreasing circles, the Midwest turned into a dust-bowl through the extravagant use of fertilizers, and the cities into filthy, polluted and drought-stricken slums. And after more than two hundred years of Medicine there is more disease than ever in the world. Many diseases are new ones caused by the ineptness of the medical profession, but others, such as heart disease, mental illness and drug-addition, arise through the inability of executives to cope with their jobs.

Speaking on BBC Television, an American journalist said that all educated—university trained—people in America know and are satisfied that the big cities are riddled with vice and corruption because "the sign of a civilized country is the respect paid to homosexuals." This journalist went on to say that it was only the backwoods people who complained of vice and filthy cities *because they are illiterate and know no better.*

A. J. BROWN

Glasgow, Scotland.

An important part of experience is learning when to ignore theory, logic and reason!

Dear John:

Seeing as how you started it all with your editorial of last October you might as well share the laughs. The letter, transcribed below in its entirety, was, by an odd coincidence, received by me on the same day that I picked up the June issue of Analog, in which my own letter was printed. Read it and weep!

RE: Your letter in ANALOG, June 1966 . . .

You realize, of course, that pulp magazines constitute the crassest possible junk—comics, *True Confessions* and 98% of all science fiction ever written—the sort of stuff illiterates and engineers devour. The preceding factual statement is not too "lit'ry" for you to understand, I trust?

Any man who supposes that Edgar Rice Burroughs was the greatest SF "craftsman" (I won't dignify him with the word "writer") of all time could not be expected to think much of college graduates, poets, or, indeed, anybody who can speak in words of more than one syllable. I can only assume you never got past the sixth grade yourself—and proud of it, by damn!

And what were those jobs you held out there in the world which qualified you to write? Ditch digger, short-order cook, carny barker, hired farmhand, janitor, delivery boy, waiter, stock-room clerk, truck driver? Then you settled back, did you, to begin competing with Heinlein and Stanton A. Coblentz?

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Your friend in England—What did he do to deserve your ridicule? Go on to grad school?—must have seen you were making a little money; naturally he wanted to get some gravy himself. Offer your services (such as they are?) to a friend? Oh, no! Push his face in for him? You bet!

Euclid knows I'm no science-fiction writer. I only read it—the 2% that's written for me—"The Stars My Destination," "The Man Who Lost The Sea," "The Man In The High Castle," "Go For Baroque," "Gladiator At Law," "Against The Fall Of Night."

Funny thing about those stories. They're quality. Not just because I say so, too. And that puts them way out of your league, buster. You'll probably dismiss this whole rebuttal as "precious" trivia. I reckon I gotta expect that when arguing with a bigot.

E. Francis Litchman

P.S. "Would you buy it for a quarter?"

Written on back by Susan: No comment necessary. Please do NOT answer.

My reply:

Dear Mr. Litchman:

Sorry to disappoint you, but I see eye-to-eye with you on the books and authors you mention—with the exception of Stanton A. Coblentz.

And I'm sorry, too, to have to tell you that actually I'm unqualified to write. I've worked at only one of the glamorous trades you cite—short-order cook—although I suppose that I could equate "kennelman" with "hired farmhand."

Come to that, as Master of a trans-Tasman cargo liner I might be classed as a truck driver (maritime) . . .

Yours faithfully,
A. Bertram Chandler,
F.B.I.S., M.A.S.A.

Fantastic, ain't it? Not a typical reader of Analog, I hope. Certainly not one of *my* faithful readers; he didn't even read my letter in the magazine correctly.

Actually, I'm rather peeved—but only because Susan deals with all my business (and, but rarely, fan) mail in my absence, and that uncalled-for diatribe somewhat shook her.

With salutations from one illiterate to another,

A. Bertram Chandler

Definitions: A bigot is one who can see things in only one way, and is so sure of it he won't argue.

A fanatic is one who can see things only one way and sets out to make every one else agree.

Your correspondent was not a bigot.

Dear Mr. Campbell:

Re S. Vietnam's governmental troubles, in the July, 1965, edition of Analog, in an editorial entitled "Keeperism," you said: "All evidence indicates that what's needed is a strongly centralized military dictatorship, with a powerful

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and stable bureaucracy that is rigidly honest . . . A civilian system won't do it—and the Vietnamese won't have any trust-respect for a civilian system. (They had one for years; they know about those.)"

Do they? Now that the Ky regime has been in for over a year, it appears that Vietnam may have the beginning of a "strongly centralized military dictatorship," apparently just what they need. However, what are the Buddhists yelling for? A civilian system—some people just can't be satisfied.

As to a solution to the entire Vietnam mess, how about something on the line of this: All foreign troops, including ours, to be pulled out, and let the Vietnamese fight their own little civil war. Of course you would need guarantees against foreign infiltration. This plan would probably be impossible to carry out, though, because we'd want to be reasonably sure that our side would win; the other side would feel the same way. We'd send advisers; they would, too; Both would send a few troops to back up the advisers; and so forth, back to the same old mess.

DENNIS BARR
RFD 2
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"Fair" turns out to mean "I won just as I knew I should," and "unfair" to mean "you did something I didn't expect so that I lost when I knew you were going to!"

The Buddhists want to run Vietnam; Ky's a Buddhist, so at first the Buddhists were satisfied. But Ky turned out to be impartial—which is "unfair," as above. So now the Buddhists want him thrown out. They don't want a civilian *government!*

Dear Mr. Campbell:

I am writing in reply to Roger Smith's letter in the August 1966 issue of Analog. I have in front of me two stories he might be interested in. They are both concerned with communication though the first one also delves into the problem of defining just what a human is.

The stories are "Overproof," by Johnathan Blake MacKenzie (Analog, October 1965), and "The Alien Way," by Gorden R. Dickson (a novel published by Bantam Books; No. F2941).

The latter brings out a very important point in communication between people (and things) of divergent or different backgrounds. The first thing to realize in a case like this is that the way of thinking is bound to be different in each of the meeting entities. The problems caused by this are amplified upon and then quite nicely solved by Mr. Dickson. (Sorry if this sounds like a book review but if I enjoy a book I like to pass it to other people. Mr. Smith should enjoy both stories and also collect material for his thesis.)

PETER COLBY
289 Mill Street
Newtonville, Massachusetts

The first requirement is that both sides WANT to communicate!

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SECRET SCIENCE
continued from page 9

very useful medication for inducing the heart to form new arteries that can bypass plugged-up coronary arteries, restoring a stricken heart to good strength.

Any half-trained organic chemist could analyze the stuff and find it's one of the standard high-explosive materials, *pentryl.* Various commercial explosive manufacturers produce it by the ton.

The "generic equivalent" of Peritrate is, then, available in ton lots at a price amounting to a couple of dollars a pound.

A dose of Peritrate is, of course, in the order of milligrams, not megagrams. The "generic equivalent" of Peritrate, one of the senators brought out in a Senate investigation, sells for about two dollars where the Peritrate sells for eighty dollars.

The U.S. Government buys tetracycline from Italy, instead of from the U.S. company that holds the U.S. patent on it, because the U.S. company's price is higher. The U.S. company is trying to collect something to pay for the research department the Italian company doesn't have to maintain—they can have their research done by one librarian in the open files of the U.S. Patent Department.

Conclusion: Any U.S. company that *patents* a chemical process is out of its ever-lovin' mind. Unless it patents *only the part of the process that can be determined by simple chemical analysis.*

Take a piece of extremely high-tensile steel, and make a chemical analysis of it to duplicate it. Turns out to be a simple carbon steel, with some manganese, a little chromium, nickel and some traces of other things that seem to be what was left over in the scrap steel that went into the melt pot when they made the stuff. But steel made up to that formula, and tempered, shows only 125,000 psi tensile strength; the original sample tested at 300,000.

The original manufacturer had found a heat-treatment cycle that did things to the crystalline structure—and one of those "accidental traces" *wasn't* accidental. Go ahead, bub—duplicate the stuff, damn your thieving soul! By the time you work out how we did it, we'll have established ourselves in the market as the only ones who can do it—and you "can copy all you can follow, but you cannot follow my mind—so I'll leave you, sweatin' and stealin', a year and a half behind!"

The point is, the would-be copy of the super-strength steel is chemically identical—it's a "generic equivalent." But it is totally different in physical structure, and, therefore, in effect!

Much of the secret of any modern chemical process is the catalyst used that converts a process with

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0.5% product, and 99.5% corrosive, toxic, stinking wastes that can be disposed of only by expensive treatment into a process with 80% yield and 15% salable by-product, plus CO_2 and water. The discoverer patents his process, his catalyst, and tells everyone that the trick is to use a nickel catalyst.

Hah! Sheet nickel, maybe? Don't be silly! The real secret is that the nickel is passed into the reaction zone as nickel carbonyl, which gas breaks down to yield nickel in a highly effective form, at a temperature of 450°, provided a distillate from crushed tomatoes is passed through with it. (Nobody knows exactly what it is about the stewed tomato gas that does it—they've simply found it does. The inventor discovered this process when, after his 798th attempt failed with a soft *hissssh*, he lost his temper in utter disgust and threw the lettuce and tomato sandwich he was having for lunch into the retort. It took another six weeks of research to determine it was the tomato that did it. *Fresh* tomatoes; for some reason damaged ones don't work.)

Most catalytic processes today depend on the precisely controlled physical condition of the catalyst—not on what its "generic equivalent" is. The patent will happily reveal that the catalyst used is iron. But what they do to the iron to get the catalyst efficiency up above about 0.0001% is damn well their secret. And they don't patent it, because if they do the U.S. government will not protect their research investment, and will proceed to buy the product from some Italian company which can legally produce it without bothering with royalties, with lower labor costs, and no research division overhead to worry about—except, of course, that librarian in the open U.S. patent office.

And "friendly relations" may lead to the company being forced to cease defending its patent rights —but their trade secrets are their own business, and can not be pried loose.

Instead of patent suits now, there are more and more Trade Secret suits—which are raising a fantastically complicated problem of individual human rights. If Dr. Quidius Jones has been working for the Mammoth Chemical company for ten years, working largely on their development of a process of making titanium dioxide pigment by a new process that yields a pigment of higher reflectivity and greater covering power, and Dr. Q. Jones has been hired away by the Stupendous Chemical & Pigments Corporation who are working on a new TiO_2 process—is Dr. Jones being hired for his abilities as a research scientist, or for his knowledge of TiO_2 processes which Mammoth spent ten years and X million dollars developing? And how can you prove it one way or the other?

Because the brightness and color

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and covering power of TiO_2 pigment is *not* a mere matter of "generic equivalent" by one hell of a long way. Rutile is native TiO_2; it's also called "nigrine," from which you could guess its usual color. The handbook says, however, that it's reddish brown, reddish, yellowish, bluish, violet or black. That's TiO_2, and is the "generic equivalent" of the TiO_2 being offered for sale as a white pigment.

Moreover, the difference is *not* simply a matter of impurities; it's a matter of the physical form of the crystals produced.

Of course, when it comes to the question of impurities and their effects—consider two pieces of crystalline silicon that are "chemically pure" to the limits of the most delicate chemical analysis. Obviously these are "generic equivalents"—only it so happens that one is transistor grade, and the other is hopelessly contaminated from the viewpoint of a transistor manufacturer. Pure to the limits of *chemical* analysis does *not* fulfill the requirements of transistor manufacture.

So "generic equivalents" can vary wildly with respect to physical form—*which can be* absolutely crucial—as well as being non-interchangeable on the basis of minute impurities. Of course, a good transistor is *not* pure silicon; if it were it wouldn't be an *n-p-n* or *p-n-p* unit—it's the distribution and quantity of impurities that counts.

In medicinals, where that term "generic equivalent" first came into prominence, the situation is even more delicate and complex. Physical form is just as crucial as it is in catalysts; the most extreme example might be the use of activated carbon filtration and absorption. The charcoal they sell at your local supermarket is the "generic equivalent" of activated carbon; it, too, is carbon, in an amorphous form. Graphite, on the other hand, is carbon, so it's a "generic equivalent" of activated charcoal—as is diamond. It is not recommended that you replace the activated charcoal in your gas mask with diamonds, even if they are "higher quality," or even "higher purity" carbon.

Milk of Magnesia is one of the fastest acting antacids known to Man; generically, it's simply magnesium hydroxide slurry. Major chemical companies produce $Mg(OH)_2$ as an industrial chemical, from which metallic magnesium is derived, by the ton; it sells for about $15 a ton, and it meets in full the U.S. Pharmacopoeia standards of purity.

I don't recommend it as a "generic equivalent" of the medicinal type. The industrial-chemical manufacturers are not interested in fineness of crystalline form, of absorptive power, or rapidity of reaction with stomach acids.

A "generic equivalent" simply means it has the same *general* chemical composition; it meets U.S.P. criteria of purity, and is sold

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as a medicinal material.

What's missing is the fact of Secret Science—the science and technology that's been driven underground by the Democratic principle that just because a man has invested a lot of time and effort and hard work in learning something is no reason why he should get any special reward or privilege. So patents are un-democratic, and we're going to weaken them until they don't give anyone any special reward or privilege.

Wherefore, the investment of a few million dollars in research is *not* going to be patented—save in such broad terms it won't do anybody any good.

It's going to be a carefully guarded Trade Secret; then everybody is perfectly equal, and nobody has any special privilege. Every other manufacturer is perfectly free to use the Trade Secret, too—if he can sweat it out, or be lucky enough to throw his lettuce and tomato sandwich in the right retort. We're right back to the Seventeenth Century, where all manufacturers operated under Trade Secret technology.

Nature is perfectly willing to reveal her secrets to anyone who can dig them out—that is Democratic. Of course, it's undemocratic in that intelligence, determination, ability, and luck aren't distributed equally, so not everyone has what it takes to achieve that understanding. But the Trade Secret system of doing things —the Secret Science approach to technology—is a perfectly Natural response to imposed-equality Democracy.

Of course, since Medical Ethics holds that all ethical M.D.s, pharmaceutical and biochemical investigators should be freely willing to publish their discoveries to all their confreres, Trade Secrets are technically unethical.

Too bad. That's based on an old proposition that making money is an ignoble business, that truly Noble People don't consider such mundane things as making money.

That's a lovely idea. And who, then, gets to pay for the laboratory facilities, the hundreds of thousands of man-hours of work that go into raising all those guinea pigs and white rats and monkeys that are essential to the medicinal research? Who pays the tariff on all the complex organic syntheses that have to be carried out, trying variations on a molecular theme, to find an efficacious, but nontoxic drug?

The utter stupidity of suggesting that research should be carried out without hope of monetary reward —should be given away freely to the world—can only represent first-class hypocrisy. No half-educated individual in our present culture could *honestly* believe any such thing—that the results of twenty million dollars worth of research should be freely given away.

But they'd love to believe that

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when they want the results without paying for it. It's that attitude that's broken down the patent law, and led to the U.S. government buying drugs from an Italian firm which flagrantly infringes on a U.S. drug company's patent.

The simple fact of the matter is that "generic equivalent" drugs aren't equivalent—because of the Secret Science, the Underground Science, that the different manufacturers have kept as Trade Secret know-how. You think maybe penicillin is penicillin is penicillin . . . ? Look it up somewhere, and see how many different modifications of the penicillin molecule different strains of *penicillium notatum* produce . . . so far as is publicly acknowledged, that is! The actual number nobody knows—because you can bet there are Trade Secrets in every major pharmaceutical house, and they aren't exchanging information. Not when Trade Secrecy is the only method left to them to protect their research investments!

Antibiotics, our most powerful weapons against disease, are the products of living organisms. Now everybody knows that beer is produced by fermenting a grain mash with yeast. So go ahead and make your own home brew, which will, of course, be a "generic equivalent" of that produced by the great breweries.

If it doesn't taste quite the way you expected, go down to a good local brewery, and ask the brewmaster for some of his yeast, and see what response you get.

The yeast strains used by the great and famous breweries are their most closely guarded Trade Secrets. Yeasts are living organisms—and their exact combination of products are unique, and unmatchable.

Precisely the same situation applies in the fermentative processes in cheese, bread—or penicillin, tetracycline, or any other biologically produced antibiotic.

Generic equivalents? Hah! So's home brew and Budweiser!

The growing everybody's-equal-or-we're-gonna-make-'em Democracy we're currently stuck with is driving Science and Technology back to the Seventeenth Century approach of Trade Secrets and non-communication of the working facts of processes.

I once worked for Carleton Ellis, the man who held more chemical patents than any other man in the world; he was an unquestionable genius of the first water—both chemically, and as a patent-writer. He was particularly known for his ability to patent Mendeleef's Periodic Table of the Elements, and get away with it. Many an inventor of some chemical process would, on applying for a patent on his newly developed process, find that Ellis had a patent originally covering something else, but written so remarkably astutely and broadly that

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it covered this new development, too. In patenting a catalyst, Ellis might claim as his catalyst "an element of the fourth group of the Periodic Table, preferably, but not necessarily, of the fifth period," meaning "Tin works, but I'm not missing any bets and I claim also carbon, silicon, germanium, titanium, zirconium, hafnium and lead."

There is, indeed, an information explosion in science today. Part of the trouble with that information explosion is that to advance his standing, a scientist *must* publish. But, if he's an industrial scientist, he *must not* publish anything really useful and valuable to his company —that's a trade secret. The result is that what gets published is as broad, and actually unhelpful, as one of Carleton Ellis' astute chemical patents.

The real science and technology —the know-how data that's truly what makes things work—is thoroughly buried in the Secret Underground Science.

Of course, the government scientists are in precisely equivalent positions—with the difference that if they publish a discussion of what they're doing, they're liable to decades of imprisonment, or death in wartime, instead of merely being enjoined by the courts from continuing to work in their field of maximum training—their own specialization.

Meanwhile, the Congressional and Senatorial investigators fulminate against the "senseless" difference in price between trade-named drugs and their generic equivalents. The difference is secret know-how, resulting from costly research, that the "ethical" drug companies can't come out and say they've developed and are keeping secret. Because, thanks to our crazily mixed up, hypocritical culture, to acknowledge that they *do* have secret information, and *are* keeping it secret (though every M.D. and pharmaceutical manufacturer knows damn well they have and are!) would disqualify them as "ethical" pharmaceutical houses.

The result is the manufacturers of trade-named drugs of exceptional value can not defend themselves against the charge of pointless or senseless "overcharging" for their tradenamed drugs vs. the "generic equivalent".

Next time the doctor prescribes some lime-water for the baby—give him a hunk of mortar to gnaw on. After all, they're generic equivalents!

There is, of course, one kind of overcharging we get stuck with. That's the matter of a trade-named drug sold at one price in this country, and at a drastically lower price in an adjoining country. Specific example: "Benzedrine" is the Smith, Kline & French trade-name for amphetamine sulfate. Currently the amphetamines are being heavily attacked because of the misuse of the drug; some years back, before the

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pressure was on, the 10 mg. tablets sold, in the U.S. under prescription for about $5 per 100. At the same time, Smith, Kline & French trade-named Benzedrine sold in Mexico City for about 50¢ per hundred. No question of generic equivalent involved; it was the same material, produced by the same company, with only the difference that the label was printed in Spanish instead of English.

That type of price differential results from a somewhat different mechanism. *Somebody's* got to pay for the research investment drug companies make—and that's the drug industry's "graduated income tax" system. Their price structure is based on the ability to pay. There was, at that time, no point trying to get $5 per 100 from the Mexicans; their maximum return on investment was at about 50¢ per 100 there—but in the far wealthier U.S., it was at the $5 figure.

The simplest way to determine what the economic score is, to see whether the drug industry is really gouging the public, is to look at the dividends paid on the drug company stocks. I.e., how much do they have to pay to borrow the money they need to operate?

The old concept of "profits" simply doesn't make sense any more; with public ownership through stock, "profit" is simply what the company has to pay to the people who loan them the money to keep the company running.

Because they are public stock companies, the record of earnings vs. expenses is on record. If they were making such enormous "profits" as the howlers in Congress suggest—what do you think Wall Street would be doing about it?

The major reason they aren't making much net earnings over expenses is the immense burden of research costs the FDA has loaded on them, over and above the direct cost of actual research.

On top of which, if a man turns up violently allergic to strawberries, so that he goes into convulsions, chokes, and dies of systemic shock —his friends, family, doctor, and neighbors say, *"Tsk! Tsk!* Isn't it too bad. There Jim was, only thirty-two years old, and dead so suddenly. Too bad."

But if he turns up, instead, violently allergic to some new, highly efficacious remedy for a disease, goes into convulsions and dies . . . then his friends, family, neighbors, and the FDA unite in screaming "Sue the company that made that poisonous stuff! It's all *their* fault!"

And that's more of the reason why trade-named drugs have to lay aside reserves. Some freak individual might turn out violently allergic —and nobody then blames *him* for having a freak metabolism; they blame the drug company.

And that, friends, is why your drug bills keep getting higher and higher.

The Editor.

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